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Personal Incomes, Costs and Prices

Last week the Government issued a White Paper outlining their views on the problem of arresting the present inflationary tendencies. The statement is very clear and postulates that only in an exceptional case, such as that to be associated with increased production, is there to be any other mass rise in wages. Where increases are granted, there will be no chance of augmenting sales prices where the latter are controlled. Whilst we agree that steps such as have been outlined must be taken, we object to the argument that accompanies them. Thus the high-grade craftsman, who for years has been giving of his best, must " stay put," whilst those on repetition work may earn more if increased handling facilities enable higher production to be given. Fundamentally it is a short-sighted policy and reminds us of a case during the war when the foremen in a North-East Coast works sent in a round robin asking for jobs as repetition machinists! Industry is short of apprentices and the great incentive parents had for having their lads taught a trade was the tradition that, under normal circumstances, they would earn more money than unskilled and semi-skilled operatives. Now the rule seems to be payment according to their presumed value to the State. There is no recognition that these mass producers can only continue so long as there exists a cadre of specialised craftsmen to provide and maintain the machinery used.

However, the Government's plan has been stated and a prime requisite for its successful operation is not only the use of systematic costing, but the implementing of a unified method within each industry. This is necessary because there is to be no passing on to the customer of increased manufacturing costs, where the increase is due to a wages award, except in special circumstances. The incidence of what on paper may look like a uniform extra cost of labour is by no means a fixed percentage on production costs. It is much lighter in its impact on the mechanised shops than on those which, through normal commercial conditions, cannot mass produce. A system of putting skilled workmen on the staff and paying them so many hundreds a year and generally treating them exactly like the office staff has been tried out with excellent results. There has been a great reduction of absenteeism and lateness in arrival. This system, allied with a shareholding scheme, appeals to us as being the ideal to be sought.

A crisis such as is to-day the lot of this country, would seem to call for a rescaling of wages based on justice. That is, the day labourer should receive £x per week, the semi-skilled a minimum of £$x+\frac{x}{4}$; the really skilled £2x and so forth through to the foremen and even beyond. Herein is a true recognition of skill and responsibility which in the long run must be of the greatest value to the community. Moreover, increased monetary recognition would be gained through progressive skill and increased responsibility and not by dabbling in gambling as is at present the case. The principle of a basic wage for day labour with graded increments for skill is, we believe, now operating in Australia. Obviously, the system we have advocated is revolutionary, but, as the Prime Minister pointed out in his broadcast, the traditional differences in rates of wages no longer apply in this changed world. Thus, if changes are deemed to be necessary, they might as well be put on a realistic basis and not just be the result of the smartness and power of the parties fixing labour awards, the major factor in which has usually been the ability of the market to absorb the cost of any increases given.

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Forthcoming Events

(Secretaries are invited to send in notices of meetings, etc., for inclusion in this column.)

FEBRUARY 16.

Sheffield Society of Engineers and Metallurgists.

Exhibition of Technical Films, by arrangement with the Iron and Steel Institute, at the Royal Victoria Station Hotel, Sheffield, at 6.15 p.m.

FEBRUARY 18.

Institute of British Foundrymen.

Lincoln Section :—"Venting of Cores and Moulds," by D. Killingworth, at Lincoln Technical College, Lincoln, at 7.15 p.m.

Institution of Production Engineers.

Wolverhampton Section :—"Plant Maintenance," by D. Bailey, at the Wolverhampton and Staffordshire Technical College, Wolverhampton, at 7 p.m.

Institute of Welding.

North London Branch :—Question night at the South-West Essex Technical College, Walthamstow.

FEBRUARY 19.

Institution of Production Engineers.

Leicester Section :—"Malleable Castings—Applications in Engineering and Machine-Shop Practice," by W. E. Marshall, at the College of Technology, Leicester, at 7 p.m.

FEBRUARY 20.

Manchester Association of Engineers.

"Hard Metal in Industry," by G. J. Trapp, at the Engineers' Club, Manchester, at 6.45 p.m.

Keighley Association of Engineers.

"Precision Machine Tools," by J. E. Hill, at Devonshire Buildings, Keighley, at 7.30 p.m.

Institution of Mechanical Engineers.

Joint Meeting with the Institution of Electrical Engineers. "Corrosion of Heating Surfaces in Boiler Plants," by J. R. Rylands, M.Sc., and J. R. Jenkinson, B.Met., at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W.1, at 5.30 p.m.

The Technically Controlled Castings Group

The Technically Controlled Castings Group held its quarterly meetings at the Queen's Hotel, Birmingham, from January 22 to 24, 1948. On the evening of January 22 a dinner was held and a presentation was made to Mr. L. W. Bolton, who was the first secretary of the Group, and who has now resigned to take up an executive position with the Nuffield Organisation at Wellingborough. The works of Messrs. Shotton Bros., Limited, Oldbury, a member firm, was visited on January 23, and a discussion on this visit took place in the evening. The works of Coneygre Foundry, Limited, Tipton, was also visited. The quarterly general meeting was held on Saturday, January 24.

THE IDEAL HOME EXHIBITION to be held at Olympia from March 2 to 25 is to carry a special section devoted to both antique and modern clocks. Readers connected with the more artistic side of foundry practice should find this display of special interest.

Correspondence

[We accept no responsibility for the statements made or the opinions expressed by our correspondents.]

DETERMINATION OF CRUSHING INDEX

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—It was with great interest that I read of the method which Dr. Hurst employed to calculate the "Crushing Index" of metallic abrasives ("Methods of Testing Metallic Abrasives," FOUNDRY TRADE JOURNAL, January 22, 1948).

For some time I have used a similar method to give a simple grade number (G) to moulding sands, and it is interesting to note that "G" is related to the permeability (P) by the equation $GP_n = K$, where n and K are constants depending on the type of sand and the degree of ramming.

The method of finding "G" differs slightly from that used by Dr. Hurst, but, as will be seen from the following, the principle employed is more or less identical.

$$G = \frac{\Sigma S_1W_1 + S_2W_2 \ldots\ldots S_nW_n}{\Sigma W_1 + W_2 \ \ldots\ldots \ W_n}$$

Where S = Sieve number,

W = Weight retained on each sieve.

I have found "G" to be a most invaluable index in the study of sands, and would be glad to hear from any of your readers who may have used a similar system.—Yours, etc.,

ALEX. W. DONALDSON,
Metallurgist.

Fullwood Foundry Company, Limited,
January 30, 1948.

OUR CANING

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—On page 116 of your issue of October 9, 1947, is a criticism of your habit of referring to abbreviations standing for some body or institution without indicating what the letters mean. I have felt a little bit this way myself when reading your JOURNAL, but the purpose of this letter is to say never have I seen an Editor, in answer to a criticism, fail at least to argue the point, and your plain "We quite agree, and will make every endeavour in the future to ensure clarity" is a statement which inspires respect, and is the cause of this letter being written.—Yours, etc.,

P. N. DAVIES.

Davies & Baird Pty., Limited,
15, Brunswick Road, Brunswick, N.10,
Melbourne, Victoria, Australia.
December 8, 1947.

MR. P. A. H. ELLIOT, director of the Combustion Appliance Makers' Association, recently paid a visit to the *Centre Technique*. The liaison thus established is to be maintained.

Notes on Pattern Construction*

Use of block cores permits of greater precision moulding

By R. J. Hart (Lake & Elliot, Limited)

INTRODUCTION

In dealing with pattern construction, the importance of close co-operation between the designer, patternmaker and the foundryman cannot be over-emphasised. In many instances this is overshadowed by the urgent demand for the finished castings. A pattern correctly constructed simplifies the moulding and coremaking, thus reducing the percentage of scrap castings as well as production costs and time for delivery. Foundries producing castings for their own machine shops have the designer at hand, and by combined negotiations, many modifications can be made to overcome casting difficulties, such as excessive variations in metal thickness, protruding webs and bosses which must be worked "loose."

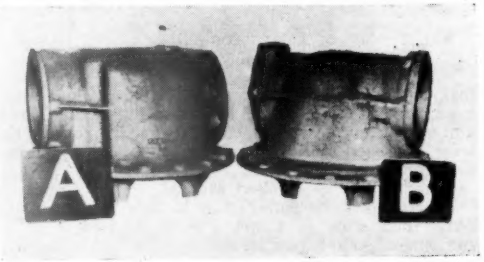

FIG. 1.—WORM DRIVE CASINGS.

Economies Possible by Co-operation

The co-operation of the designer can often help in reducing pattern costs. He would know the exact functioning of the particular casting; for example, that one which might appear to be important enough to require a first-class precision pattern, could be just as effectively produced in considerably less time from a metal pattern filed or ground to the required dimensions. Foundries producing castings from equipment supplied by customers cannot always discuss technical details with the designer or patternmaker, consequently a pattern which seems correct to the maker may cause unlimited trouble to the founder.

When estimating from a drawing for castings similar in design to castings previously produced, all problems encountered on the originals must be taken into consideration and necessary alterations specified to the design or the construction of the new pattern equipment. This may meet with opposition at times, but if the production of a cleaner and more accurate casting is guaranteed, steps can be taken to meet the requirements of the foundry.

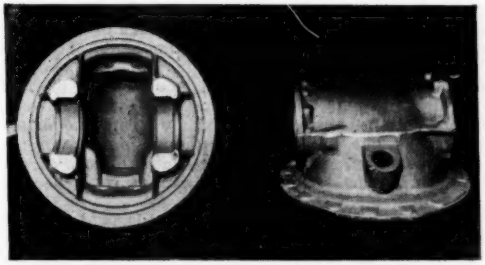

FIG. 2.—WORM DRIVE CASINGS (INTERIOR VIEW ON L.H.S.).

To stress the previous point two castings of worm drive casings almost identical in design, but having slightly different dimensions, are shown in Figs. 1 and 2. Casting "A" is the original design, and "B" a type manufactured for post-war vehicles. The details common to both castings are the large bolting flange with machining pads, the half bearing with heavy sectioned bosses (which are drilled and tapped), the main bore, situated to give a close limit clearance for the gear wheels, the strengthening webs, and the stud bosses on the small end-flanges.

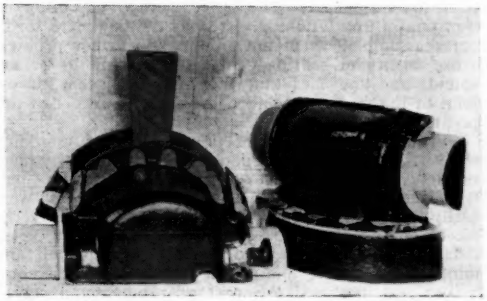

FIG. 3.—PATTERN EQUIPMENT FOR TYPE "A" WORM DRIVE CASING.

*A contribution to a Symposium organised by the East Anglian Section of the London Branch of the Institute of British Foundrymen.

Notes on Pattern Construction

Original Method of Moulding

The pattern equipment for model "A" was supplied by the customer, the patternmaker using his own discretion in construction, and the method he adopted is illustrated in Fig. 3. The pattern is made of mahogany and is split and dowelled for hand moulding. The joint line cuts through the main bore and large bolting flange, with a circular core print incorporating the half bearing and supporting the centre core. The side webs, bosses and machining pads which will not mould are worked as loose pieces. When the equipment was put into production, the following moulding difficulties, unforeseen by the designer or the patternmaker, became apparent.

The semi-circular cores shown in Fig. 4, for forming the main flange and incorporating the half-bearing, had to be fixed in the top half of the mould, with the possibility of so causing a cross jointed flange, or alternatively the two cores had to be joined and placed in the bottom half of the mould, with the danger of causing a crushed or dirty mould when closing the top part over the deep core. The latter method of coring up was finally used and Fig. 5 shows the complete set of cores assembled as in the mould. A further problem arose when the bearing bosses were found to be unsound, and the fact that they were adjacent to the joint of the mould precluded the use of a feeder at this point.

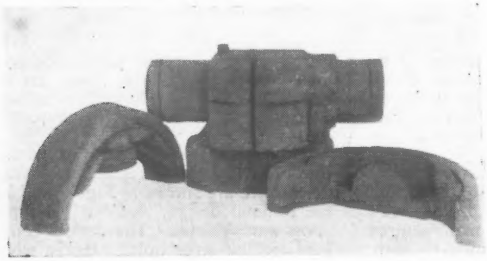

FIG. 4.—CORES FOR WORM DRIVE CASING, TYPE "A."

Further disadvantages of this method of moulding were the delay in production, due to frequent repairs having to be carried out to the pattern, since the very thin webs and flanges were easily damaged when ramming, and the loose pieces were often lost in the sand. The semi-circular cores had to be dried on bedding sand and jointed to a gauge; this was a job for a skilled coremaker and increased the cost of producing a set of cores. On the receipt of an inquiry for the new standard type of worm casing, type B, the drawings of both castings were compared. The moulding and core-making difficulties encountered with the original equipment were noted and slight modifications to the design and an entirely different method of pattern construction were suggested and accepted by both the designer and patternmaker.

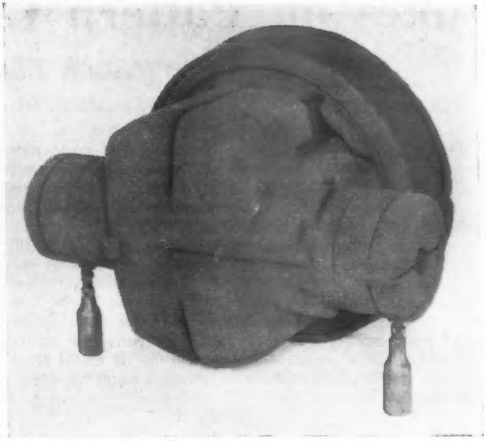

FIG. 5.—SET OF CORES FOR WORM DRIVE CASING, TYPE "A," ASSEMBLED AS IN THE MOULD.

Revised Method

Fig. 6 shows the pattern for the new type of casing. Large quantities of castings were required from this equipment, so the pattern and all the coreboxes were metal faced, with flanges and thin webs made of metal; the exposed points on the pattern likely to be damaged by the pneumatic rammer during service in the foundry,

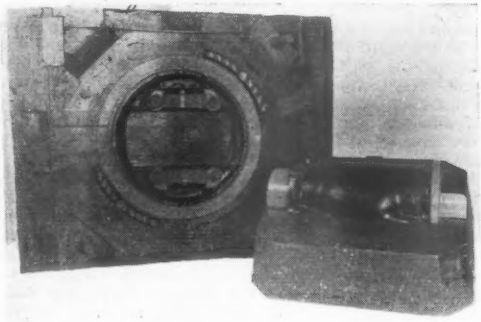

FIG. 6.—PATTERN EQUIPMENT FOR TYPE "B" WORM DRIVE CASING.

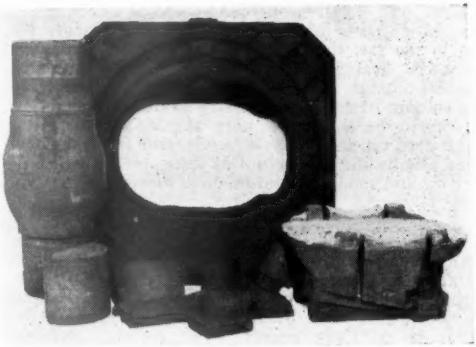

FIG. 7.—SET OF CORES FOR WORM DRIVE CASING, TYPE " B."

were protected by metal. The joint line was made under the large bolting flange, as the small end-flanges and part of the casing would mould that way. The large flange, machining pads and side webs (which were incorporated in one large block core print) made the bottom half of the mould. The half bearings and bosses were assembled on a mahogany board and formed the top half of the mould. Feeders were fitted over the heavy section of metal to prevent the unsoundness encountered in the old design.

It will be seen in Fig. 7 that nine different cores were required for each mould, but as six of them were very small and the boxes for the large cores were constructed to suit the core-stripping machine, the work was suitable for female labour. The main bolting flange can be seen in the large block core, and the possibilities of distortion

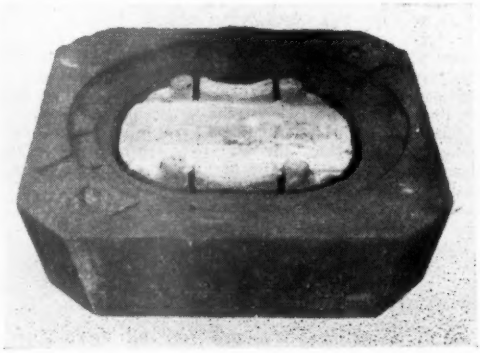

FIG. 8.—CORES FOR TYPE " B " WORM DRIVE CASING, ASSEMBLED IN BOTTOM HALF OF MOULD.

or a lapped joint, were obviated by this method of pattern construction.

All the cores were assembled in the bottom half of the mould, as shown in Fig. 8, leaving part of the core forming the end boss to close over, thus preventing the making of crushed or dirty moulds. The complete pattern equipment is painted to the B.S.S. No. 467—black for unmachined surface, yellow for machined faces and red for core prints. By adopting this specification for pattern colouring, the moulder's task is simplified when coring up moulds, and additional care can be taken to ensure clean and sound surfaces where machining operations have to be carried out.

Advantages Gained

The advantages of the new method of pattern construction are revealed by the following production figures:—

Hand-moulded Pattern.

Time for making one set of cores	1 hr. 30 min.
Time for making and coring up mould	3 hrs.
Total time	4 hrs. 30 min.

Machine-moulded Pattern.

Time for making one set of cores	1 hr. 49 min.
Time for making and coring up mould	1 hr. 1 min.
Total time	2 hrs. 50 min.

By this information, coupled with the knowledge that over twelve monthly periods the scrap castings were reduced by 50 per cent., the additional co-operation of the designer and moulder is shown to have been justified.

Twenty-two Presentations

Twenty-two employees of the 600 Group, of which the parent company is George Cohen, Sons & Company, Limited, have been presented with awards commemorating 25 years' service. Since this custom started, 147 such presentations have been made. Over 100 employees of the 600 Group have more than 25 years' service. Although the firm, established in 1834, has recently been converted into a public company, the majority of the directors are direct descendants of the founder, George Cohen, and there is still a strong "family feeling" in the business. Typical examples are the records of the Sheppard and Sweeting families; three members of the Sheppard family have in succession been the company's foremen-lightermen, with a record of 153 years' service—Jack, 53 years; Jim, 61; and Dick, still in the company's service, 39 years; the three members of the Sweeting family have between them a century's service.

Mr. Oliver Smalley, O.B.E., president of the Meehanite Organisation, has left America in order to make a personal survey of the foundry industry of Australia.

D

American Core-making Practice

Mr. O. J. Myers, Foundry Research Director, Werner G. Smith Company, addressing the opening meeting of the Twin City Chapter, American Foundrymen's Association, pointed out that, although raw linseed oil has been used by foundrymen for years in the production of cores for castings, it is no longer either economical or practical to do so to-day. He maintained that a good grade core oil from a reputable manufacturer should be used in place of raw linseed oil for the following reasons: Higher core tensile strength, with attendant reduction in the amount of oil necessary; less cost to the foundry; faster baking with more rapid production; lower baking temperatures with less fuel consumption in the core ovens; better collapsibility bringing faster shake-out; and more uniform quality.

Core Sand Ingredients

He briefly discussed the various ingredients used in core-sand mixtures. The simplest core mixture to make would consist of sand and oil. The only reason most core-sand mixtures were not compounded using just sand and core oil was because the usual core oils, as formulated to-day, did not give the sand enough green strength for the cores to be handled prior to baking. Contrary to the usual thought in the foundry, the use of water in a core-sand mixture neither imparted hardness nor baked strength to a core. The advantages of using only sand and oil were as follows: Only one ingredient need be added to the mixer. This permitted easier mixing, better sand control and more storage space around the mixer. The bench life of the core-sand mixture was increased, since there was no "crusting over" of the sand; less baking time was necessary to bake a core thoroughly because there was no moisture to evaporate from it; there was a decided decrease in sticking of sand to the patterns. Water was used alone with an oil-bearing sand to give added green strength to the mixture. It was used with an oil-cereal mixture to develop the bonding strength of the cereal binder. Water formed a paste with the starch and gluten in the cereal binder and worked with oil in forming dry bond. Increased amounts of cereal gave additinal baked and dry bond strengths. It was usually not necessary to add more than 1 per cent. cereal (by weight) to any core-sand mixture if the moisture content of the sand were held between 1.8 and 3.0 per cent. Studies have shown that maximum green bond was developed from a cereal binder if the moisture of the sand was maintained between these levels.

Theoretical Minimum

A core-sand mixture, under ideal conditions, need not contain more than 100:1 sand to core oil by weight. This was approximately equivalent to a gallon and a quarter of core oil in 1,000 lb. of dry sand. Laboratory tests show that tensile strength in excess of 200 lb. per sq. in. could be developed using this proportion of sand to core oil. The reason foundries used more core oil than was shown to be necessary from laboratory tests lay in the fact that exact laboratory conditions could not be duplicated in the foundry itself. The type, grain fineness number, and shape of the sand used, influenced the amount of core oil necessary to make a good core. The finer the sand, the more angular its shape, the more core oil was necessary. General foundry conditions usually did not permit as intimate mixing of the core oil and sand as could be done in the laboratory.

New Baking Methods

Mr. Myers discussed at length the latest type of core-baking equipment to put in its appearance on the market—the electronic or dielectric type of short-wave apparatus. In this principle the heat is applied within the green core sand by means of rapidly alternating pulsations of radio energy. The current alternates more than 300,000 times faster than that which feeds ordinary electric light bulbs. This reversal of energy creates heat within the sand molecules themselves and, in this manner, supplies the B.T.U.s to do the work of baking. The cores are baked "from the inside out," creating an ideal condition for collapsibility. This process of baking is still in the experimental stage and has at present many disadvantages.

DUE TO UNEXPECTED DIFFICULTIES, the Second National Meeting of the *Associazione Italiana di Metallurgia* has had to be postponed until April 23 to 25. It will be held in Milan, contemporaneously with the XXVI Exhibition. During this meeting, one day will be taken up with Papers on "Corrosion" and "The Ageing of Metals"; the other two will be reserved for open discussions. For those who wish to send a lengthy summary of any contributions (from one to three typed pages, possibly with tables and diagrams), the last day for the reception of these is February 29, and for the complete text, March 31. Authors and others interested who require further information as to accommodation and the like should write to the *Associazione Italiana di Metallurgia, Via S. Paolo*, 10, *Milano*, Italy.

DR. G. V. RAYNOR, M.A., and DR. G. R. RIGBY, B.Sc., have each been given for 1947 the Beilby Memorial Award. Dr. Raynor has been signalled out for this honour because of the work he has done in the field of alloy system research, and Dr. Rigby for his contributions to the study of refractories. Dr. Rigby, in association with Mr. A. T. Green, is presenting a paper to the 1948 Annual Conference of the Institute of British Foundrymen.

THE FIRST POST-WAR International Foundry Congress will be held in Prague from September 15 to 19 this year. Following the technical meetings there will be a post-congress tour from September 20 to 26.

MR. P. H. WILSON, President of the Institute of British Foundrymen, is to participate in the Annual Convention of the American Foundrymen's Association in Philadelphia.

Cupola Practice

A Practical Yorkshire Discussion

Last Autumn, members of the West Riding of Yorkshire Branch of the Institute of British Foundrymen heard the "E. J. Cook" prize-winning Paper by J. Timbrell, entitled "Improved Cupola Design from Practical Experience." Extracts from the discussion which followed are printed below.

Continuous Tap Hole

MR. FORREST asked Mr. Timbrell what he considered to be the smallest flow of iron that could be handled with a continuous tap hole—was 2 tons an hr. too small a quantity? The iron was required to be very hot. If it were possible for a cupola to operate at this rate for 9 hrs. per day, the continuous tapping hole would be very useful. He would also like the Author's opinion of rammed linings *versus* brick linings. In his own opinion, the rammed lining was infinitely superior to brick.

MR. TIMBRELL replied that the smallest size of a continuously running tap hole with which he had experience was at the Spike Island Works, and was used for between 3½ and 4 tons per hr. One would think that this stream would be too small to keep the iron hot, particularly as in practice there were fluctuations as to metal flow, depending on the bulk of the materials being melted, but when working at this rate the metal temperature was all that could be desired.

With reference to the rammed linings, it was so long since he had any experience of this type of lining, that he did not care to express an opinion on this subject. The large cupolas of which he had experience melted 80 tons per day with a brick lining; this he considered to be a good test.

Conveyors for Cupola Charging

MR. BLAKISTON congratulated the Author on his excellent Paper on cupola practice, which provided much food for thought. The adoption of continuous conveyors for furnace charging was also receiving serious consideration for blast-furnace operation, which involved a similar application. The only drawback that could be foreseen would be to obtain suitable conveyors to stand up to the wear and tear occasioned by handling coke and pig-iron, which were difficult substances to convey. The utilisation of a detachable cupola well was not new, and this system was taken a step further in the Belgian "Calebasse" which utilised the well also as the casting ladle. Details of this, together with other unorthodox cupola designs, were published by Mr. John Sharp in 1905.

MR. TIMBRELL replied that in his investigations he had found that there was nothing really new in cupola practice.

MR. HAMMOND, referring to the movable well, wondered if Mr. Timbrell had any idea as to the power required to break the well away after a blow. He imagined that considerable fritting would take place between the well and the furnace. With regard to the winch shown on one of the sketches, utilised for easing the labour on the interior cupola repairs, he wondered what happened to this winch when the cupola was in operation. The slat conveyor, he presumed from the illustration, was a substitute for platform charging, the materials being more easily handled at ground level. In the case of the continuously running cupola, had the Author any experience of utilising the tilting spout as a reservoir for when ladles were being changed?

His own experience of rammed lined cupolas had been fairly successful, except for a prevalent trouble, where the cupolas had been mechanically charged. The vibration apparently caused lining disintegration, particularly against the cupola shell, which caused a hollowness, which, while not serious, was a factor to be taken into consideration. Would Mr. Timbrell also elaborate on the factors causing hard tap holes, particularly where intermittent tapping was practised, and say whether it would be advisable to always have an oxygen lance available.

Movable Cupola Well

MR. TIMBRELL explained that a movable well was only a suggestion, and by the use of releasing cams together with the effect of gravity, it should be easy to break the fritted zone point. The movable well should not be heavier than a ladle, if it were mounted on the right type of roller gear. The cupola repairing winch was a light structure on castors, which could be moved away when not required. His suggestion for the slat conveyor was intended for use where large stocks of materials were kept. It would work in conjunction with lift-up doors inter-connected by push-button control. The continuous tapping spout was very useful where taps were required at short intervals, and it eliminated the possibility of getting slag into the ladle. In the case of hard tap holes, if these were experienced, there was something wrong. If the tap hole was kept clean and true to taper, the oxygen lance became a luxury.

MR. GRIMSHAW stated he was successfully running a cupola delivering 18 to 20 shanks of metal in sequence, working strictly to the clock, and very seldom found slag contamination; slagging out taking place after each run.

MR. TIMBRELL elaborated on the tipping spout which could be operated by pulling a wire to tip it where a large number of shanks had to be dealt with. MR. HAMMOND interposed with an example, stating he knew of a cupola running at 15 tons per hr. which had a tapping spout arrangement similar to that illustrated by Mr. Timbrell. When the ladle was being changed a bath was formed to hold the metal during this period.

MR. TIMBRELL went on to say that one of the objects of his Paper was to make the occupation of the cupola man as comfortable as any other.

MR. BLAKISTON stated that, contrary to general belief, statistics had shown the foundry trade to be quite a healthy occupation.

Cupola Practice

MR. TIMBRELL endorsed Mr. Blakiston's remarks, and stated that in a works' photograph of personnel having more than 50 years' service, the foundry departments predominated.

Monolithic Linings

MR. FORREST again raised the question of monolithic linings, particularly in regard to abrasion. An iron brick wall incorporated into the rammed lining, extending 3 ft. below the charging door, was still above the melting zone and would last for years, and take care of any charging abrasion. These iron bricks were carried on a ring, but it was not usual to use any other ring in connection with the lining. A space should be allowed of 4 in. to 6 in. below this ring to allow the refractory lining to expand.

MR. HAMMOND stated that when he raised the question of lining disintegration, it was not with regard to charging. He experienced no difficulty at the charging hole, as he used the iron bricks for protection as described by Mr. Forrest. His trouble was the disintegration of the lining immediately adjacent to the cupola shell, probably on account of vibration, the lining material percolated through the vent holes, leaving a cavity.

MR. FORREST felt that such disintegration was caused by incorrect ramming in the first instance. In his case, vents were incorporated against the shell, and the ramming was done with a pneumatic rammer. After ramming, the lining was carefully dried. It was found, in his case, that these linings could be operated 8 to 9 hrs. per day, using cupolas on alternate days. A badly rammed cupola lining would quickly fail.

Vote of Thanks

MR. NICHOLS proposed a vote of thanks, stating it gave him great pleasure. He said that no doubt they were aware that Mr. Timbrell gained one of the prizes of the F. J. Cook award, for a Paper on improvements regarding the working conditions and general amenities of foundries. Mr. Timbrell had begun a movement to relieve and improve the lot of the furnacemen.

MR. JOHNSON, in seconding the vote of thanks, added his own appreciation of the Paper.

MR. TIMBRELL, in reply, thanked the members for the appreciative way in which they had received the Paper. The subject was so extensive that it had not been easy for him to know what to leave out. Cupola operation was not a pleasant job, but he thought conditions could certainly be improved.

Institute of Vitreous Enamellers

The Institute of Vitreous Enamellers will hold a Spring Meeting at Bournemouth from May 27 to 29. May 27 will be devoted to Council and general meetings. Technical Papers will be presented in the mornings and works visits will be arranged for the afternoons of May 28 and 29.

A Visit to an Art Foundry

For the first time in our long career, we spent a morning in an art foundry. We were attracted to the firm of Morris Singer Company, of 123, Dorset Road, London, S.W.8, because they are at present engaged on Sir William Reid Dick's statue of President Roosevelt. In such a foundry one becomes bewildered, through the dual interest in the artistic merit of the castings and in the craftsmanship which goes into their production.

Interpretation of the Model

It is the job of the art foundry faithfully to reproduce the model supplied by the artist. Whilst dimensional accuracy is paramount, yet it is not enough. If the artist's interpretations are to be reproduced, consistency and fineness in mould material must be of the highest standard in order to bring out all the sculptor's delicate texture. Patina may be applied according to the mood of the artist whose " hard " and " soft " know no Brinell, and whose " cold " and " warm " have no thermal measure. In one casting of a head, we noticed amongst the hair the impression of a finger print. This had been made by the artist, and despite the number of times this was transferred from the positive to the negative and back again, the reproduction was perfect. To the craftsman this would be a real source of joy!

Quite a large business is being undertaken in the provision of memorial plaques, and our readers will appreciate the difficulty when a 1914-18 Roll of Honour is to be matched to commemorate those who gave up their lives in the second world war. As a pattern it is devoid of contraction allowances! The technical terms used vary somewhat from those customary in the general run of foundries. A " core " seems to be the term used for the piece of sand used for taking any undercut. On the Roosevelt statue, there will be about 600 of these. There is no routine method for making art castings and sand moulding, the lost wax process, gelatine strips and plaster of Paris are used, the choice varies with the size and complexity of the model. One can imagine the envy of the foundryman whose work is sold at a few shillings per pound, in surveying a full size equestrian in bronze, and chagrin in being told of the core—and coring operations, for which no core box was supplied.

The Problem of getting Apprentices

With the exception of the plaster of Paris shop, art founding is quite a clean and obviously an interesting craft, yet there was not one apprentice learning the trade. No branch of the industry is so outstanding in the production of high grade craftsmen as that devoted to the making of art castings; many of the best foundry executives in both non-ferrous and grey iron foundries were apprenticed to this trade. If any of our readers can help the management to get a cadre of apprentices for this or any other art foundry, we can assure them that an excellent training in moulding practice will be given and a contribution would thereby be made to ensure the continuity of art founding, the disappearance of which would be an irreparable lowering of the cultural level of this country.

Developments in Shotblasting*

Mechanical Impact Blasting, Shot peening and Liquid Honing

By R. Ankers

MECHANICAL IMPACT BLASTING

Probably the most important development in the design of shotblasting machinery has been the introduction of centrifugal blasting mechanism and the application of the process to mass production methods. Contrary to general belief, centrifugal methods of

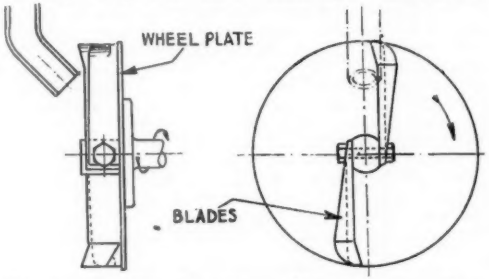

FIG. 1.—ABRASIVE PROPELLING WHEEL, BATTER TYPE.

propelling abrasives are not new, the newness and the changes that justify interest in this method are the use of improved abrasive resisting materials in the construction of the apparatus, improvements in ball-bearing design, improvements in bearing protection and the more universal use of metal abrasives.

Improvements have also been made in the methods of controlling the direction of abrasive discharge from the centrifugal wheels and in the design of the throwing wheels. There has also been much development in the methods of traversing work through the blasting chambers. Abrasive propelling wheels may be divided, in general, into two classes, namely, the batter type wheel and the slider type wheel. The batter type wheel is one composed of a single main plate on which there are mounted two blades made from abrasive resisting material and into which the abrasive is fed on the open side of the wheel at an angle which is calculated to give the required direction of abrasive discharge at the periphery (Fig. 1).

Slider Type Impeller System

The slider type wheel (Fig. 2) is made of two steel plates bolted together with distance pieces, into which are fitted eight blades of special hard alloy iron. These blades are held in position by suitable screws and are renewable. The abrasive is fed into the centre of the wheel through a control cage which is a device allowing the abrasive to be fed from a certain point to the centre of the wheel tangentially on to the blades so that the direction of abrasive discharge can be controlled around the whole 360 deg. of the wheel. By moving the control cage, the abrasive may be made to leave the wheel in any pre-determined direction.

The abrasive is fed through the aperture in the control cage by means of a small impeller wheel. This impeller is secured to the main wheel and revolves at the same speed whilst the control cage is held stationary, although it is adjustable in its position to give the required direction of abrasive discharge. The pipe leading from the storage hopper feeds the abrasive into the impeller where, of course, it discharges through the slot of the control cage on to the inner edge of the blades at a very low velocity. From this point the shot slides by centrifugal force to its discharge from the outer edge of the blades which corresponds with the periphery of the wheel.

The wheel is overhung on the end of a shaft held by two bearings and is vee-rope driven at a speed of 2,250 r.p.m. It is to be particularly noted that this speed has been carefully determined. The wheel be-

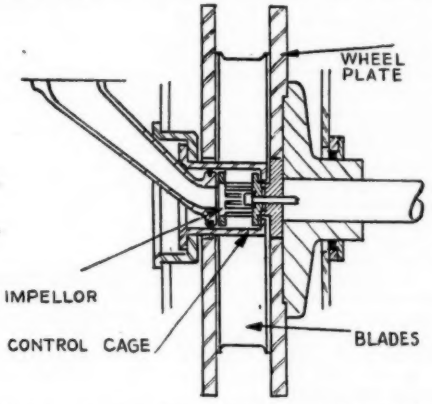

FIG. 2.—ABRASIVE PROPELLING WHEEL, SLIDER TYPE.

comes less effective when the speed falls below this figure and at 1,800 r.p.m. the cleaning action of the abrasive is only about one half of what it would be at the correct speed. This slider type wheel will discharge about 300 lb. of abrasive per minute at a lineal speed of approximately 14,000 ft. per minute.

In recent years mechanical abrasive cleaning devices have been applied to many different forms of plant to be incorporated in the production line and are particularly adaptable for mass production methods.

*Extracted from a Paper presented to the Manchester Association of Engineers.

Developments in Shotblasting

Applications of Abrasive Throwing Wheels

Abrasive throwing wheels are used on plants of the barrel type, rotary tables of the plain table or multi-table design, flat belt conveyors, roller conveyors, overhead conveyors, continuous strip cleaning plants, and so on. The barrel type is obviously intended for handling large quantities of small castings, forgings, etc., whereas the rotary table and flat conveyor type machines are primarily to be considered for the handling of work of a flat nature. The overhead conveyor arrangement can be used for carrying work through the cleaning chamber which can be fitted with multiple wheels for the satisfactory cleaning at one pass of mass-produced parts which would be too large or intricate in design to be handled in a tumbling barrel.

Mention should be made of the variables in the application to achieve any desired results and which may be classified as follows:—

Distance of the periphery of the wheel from the work; grade of abrasive; rate of traverse of work past the wheels, and, to a limited extent, the speed of the wheel.

Methods of Loading

In the operation of the plain table or multi-rotary-table machines, also the flat conveyor type plant, the work would have to be turned over at least once to present fresh surfaces to the impact of the abrasive stream. In the case of plant used for the purpose of descaling strip or sheet, multiple wheels would be used to deal with both sides at the same time and provide complete coverage for the whole area.

When an overhead conveyor is used to traverse the work through the cleaning chamber, the parts would be carried on rotating hangers, which, by means of a secondary drive on the conveyor, are caused to rotate in their passage through the chamber and in front of the abrasive throwing wheels so that each hanger gives one complete revolution in front of each wheel. Multiple wheels would be employed on a plant of this type, the number and location of wheels being determined according to the size and shape of the casting or other part. Plant of this overhead conveyor type has been applied with complete success to the cleaning at one pass of such items as motor car cylinder blocks and heads, transmission housings, and domestic bath castings.

The airless method of abrasive cleaning has also been applied to the treatment of large castings up to 20 and 25 tons, although in some such cases it has been necessary to have the addition of a pressure operated shot-blasting unit to be used for "spotting" in pockets or other points which have been inaccessible to the abrasive streams from the wheels. These plants usually take the form of a large chamber with a power-driven rotating table in the floor and on to which the work is loaded. Multiple abrasive throwing wheels are employed, these being located on the roof and on the wall of the chamber in positions calculated to give the most effective results.

The abrasive feed, return of abrasive and dust separation features on these plants do not materially differ from the principles applying in connection with pressure-operated shot-blast plants. In view of the extensive developments which have taken place in the application of shot blasting by either compressed-air operated or mechanical means, the methods of obtaining the desired results as related to the particular class of work and the production required, should be the subject of discussion between the intending user and the plant manufacturer.

Protection of Apparatus

Shot blasting in any form being an abrasive process causes considerable wear to the apparatus, and very special precautions should be taken to protect the various parts most vulnerable to the action of the blast. It is advisable, for instance, to protect the walls of a sand-blast chamber from the impact of the abrasive and for this purpose india-rubber sheeting is by far the best, but it is important to remember that the rubber sheeting should be suspended in a loose fall at a distance not less than three inches from the steel walls of the chamber. If the rubber sheet be fastened around the edges to the steel plate it will become vulcanised by the action of the blast and quickly deteriorate.

Shot-blast Nozzles

Special attention should be given to the type of nozzle used. Usually these are made of chilled iron in sizes varying from $\frac{3}{16}$ in. bore to $\frac{1}{2}$ in. bore. When deciding the size of nozzle to install it should be borne in mind that at a given pressure the area of the work done is directly proportional to the area of the nozzle. A chilled iron nozzle will last in operation from six to eight hours, dependent to a great extent upon the surface of the bore which cannot be guaranteed to be perfect as nozzles are, of course, used as cast; they are not machinable.

In continuous or mass-production methods the comparatively short life of the nozzle may cause frequent stoppages, but this difficulty can be overcome by what is known as long-life nozzles. These go under the various trade names, but are usually made from tungsten-carbide or other similar abrasive-resistant material, and may have a guaranteed life of 500 to 1,000 hours. Quite recently a new type of nozzle lining has been introduced, made of boron-carbide, and it is understood that the makers of this claim a guaranteed life of 1,500 hours when using chilled-iron shot, and a possibility of a life as long as 3,000 hours.

In the compressed-air type of plant the nozzle is usually connected by means of a rubber hose. This should be made from pure para-rubber and the tube should have a lining of this pure rubber of not less than $\frac{1}{4}$ in. thick. The internal diameter should have an area of 9 to 16 times the area of the bore of the nozzle. Any other parts of sand-blast equipment which are subject to possibility of wear, and where it is impracticable to use india-rubber, should be manufactured of sheet steel or chilled iron, and be made as robust as practicable. Experiments have been carried out to determine the breakdown of abrasive on wear plates, and

it has been found that although chilled iron resists wear to a greater degree than mild steel, a definite overall saving in abrasive costs is made where mild steel plates are used.

SHOT PEENING EQUIPMENT

The process of "shot peening," whilst being a development of shot blasting, can now be described as an

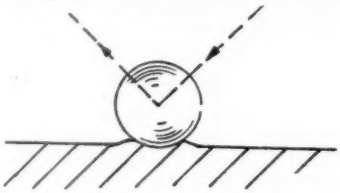

FIG. 3.—EFFECT OF PEENING.

accurately defined mechanical process which can be carefully controlled and made capable of producing uniform results consistent with the demands of present mass-production methods. Shot peening is a cold-working method designed to improve the fatigue life of metals. This result is accomplished by pelting the surface of a metal part with spherical shot at a relatively high velocity. Each grain of shot acts as a peen hammer and produces a small dent in the surface of the metal, stretching the surface radially as it comes in contact with the surface of the metal (Fig. 3) thus producing a cold-working effect in the top layer, which extends to a depth of 0·005 in to 0·01 in. below the surface, depending on the intensity of the impact and the nature of the metal.

The fibres in the metal structure underneath the top layer not being stretched to their yield point, retain their elasticity. The under fibres will, of course, be bonded to the stretched surface layer, and after peening, the inner fibres force the outer fibres to return to a shorter length than that at which the stretched fibres would tend to remain. The result is that the surface fibres are now in residual compression while the inner fibres are in tension. On considering the example of the peening effect on a leaf spring which is peened on the tension side only, it must be borne in mind that the fibres underneath the top layer are not stretched to their yield point, and consequently retain their elasticity. After peening the surface fibres are then in residual compression, while the inner fibres are in tension.

Effect of Shot Peening on Fatigue

Experiments have shown that the surface compression stress is greater than the tension stress in the interior of the metal, and when working stresses are applied which would ordinarily put the tension stress on the surface, that stress is off-set by the residual stress in the surface layer. Fatigue failures are generally produced by tension stresses and not from compression stresses, and results have shown by experiment and in practice that peening gives metal an appreciably greater fatigue life. The process of shot peening has been successfully applied in a practical way to both leaf and coil springs, torsion bars, and automobile and aircraft parts, but experiments are still being carried out in an endeavour to obtain optimum results on a variety of metal parts under varying conditions. Generally, shot peening will lengthen the fatigue life of any part that is subject to bending or twisting stresses, but has very little effect on axial push-pull stresses. It is to-day an established practical process and is proving of great value in many applications, but it should not be considered that it is a process which will correct flaws resulting from poor design.

Shot peening apparatus consists of:—

(1) *The projecting device*, which may be either of the air nozzle type or the centrifugal wheel throwing type, for the purpose of imparting velocity to the spherical shot in order to obtain the correct force of impact on the part to be processed.

(2) *Shot Separator*. This is for the purpose of separating broken and under-sized pellets from those which remain still of correct size and suitable for continued use. Separation should take place during the passage of the shot between the storage hopper and the propelling unit, and may be effectively operated by the exhaust system used primarily for extracting the dust from the operation chamber. Fig. 4 depicts a typical shot separator device. As the shot passes through the revolving circular screens the exhaust air deflects the lighter particles beyond the set point on a baffle, allowing only the correct grains to pass to the storage hopper. By an arrangement of blast gates and adjustable surfaces, a definite degree of separation is attained, and then set permanently in continuous operation. This separation

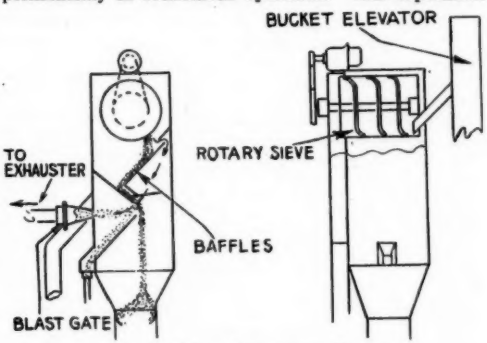

FIG. 4.—SHOT SEPARATOR DEVICE.

is necessary to produce consistent results. The separator should be tuned so that a constant percentage of full-sized shot grains is maintained in the machine. Experience shows that the quantity of full-sized grains of shot should not be less than 85 per cent.

Shot Stabiliser. The failure of shot in a peening machine is caused by fatigue fracture and occurs due to the repetition of impacts on the parts. When the

Developments in Shotblasting

fatigue life is reached, the shot breaks, and new shot is added to compensate for loss due to breakage.

(3) *The Shot Adding Mechanism* will automatically replenish the system with fresh shot to off-set that which is broken and extracted by the separator. The device is simple, consisting of a small paddle wheel, driven by a fractional horse-power variable-speed motor, which passes new shot into the bucket elevator used for cycling the shot into the separator.

(4) *The Work Carrier and Cabinet* must obviously be designed to ensure a timed cycle of operation to meet production requirements, and it is therefore advisable to arrange for a variable speed drive to work the travelling gear in order to obtain optimum results.

(5) *An Exhaust System* must be provided to ventilate the complete plant and to operate the shot separator. This consists of an air exhaust fan with ducting leading to a suitable dust collecting unit.

A number of plants are being used successfully in this country and in the United States of America, but research is still being carried out. The maximum advantages and production can only be achieved by the co-operation of the engineers and laboratory.

The author believes that the shot peening process has already developed as an aid to increase the production and the quality of many parts under constant or intermittent stress.

THE VAPOUR BLAST LIQUID HONING PROCESS

Consideration to-day of recent developments in abrasive processes would not be complete without some mention of the liquid honing process, or as it is usually known, "vapour blast." This final surface finishing process is based on the application of very fine abrasives mixed with water or a chemical emulsion and discharged by compressed air against the metal surface to be treated. The nozzle is usually of the injector type into which a mixture of alumina grain and water, or sludge, is fed by gravity and propelled by compressed air or steam at any suitable pressure up to 120 lb. per sq. inch, the alumina grain being of a fineness of 100 to 600 mesh. This application should not in any way be considered as a polishing process, in itself, but it is quite definitely an aid to polishing by reducing the time factor in obtaining a mirror finish, particularly where the object is of an intricate shape.

A more practical use is for the removal of very fine machining marks which dry-blasting would only emphasise. In such an operation the nozzle would be presented to the surface of the metal at an angle and the abrasive solution or mixture propelled over the surface of the object evenly. By variations of air pressure the results can be controlled so as to remove not more than 0.001 in. from the surface of any metal. The vapour blast or liquid honing process has already been used on pump impellers, small instruments, gears and other very small parts.

Applications of the Process

In order to illustrate the range of work where the process has been most useful, three quite different examples can be cited. (1) Removing the burrs from the eyes of needles. This operation is now done in bulk by vapour blast, where previously the operation was carried out by hand; (2) removing the machining marks prior to polishing from small steel impeller blades used in jet propulsion engines, and where it is important to maintain the exact contour of the blade; (3) the removing of machining marks from the surface of vanes of aluminium alloy main propellers of jet engines. This last example is of particular interest as the saving of man-power by adopting the vapour blast process is proved to be very considerable indeed as compared with hand polishing. The actual time was reduced from 80 hours per piece to three hours, whilst the contour of the vanes was not affected in any way.

Some operations are done in two or three stages—a coarser material at first, a little finer abrasive at the next stage and a still finer grade for the third stage to give the final finish. By a study of the number of stages a saving of time can be secured, as naturally the coarser abrasives cut more quickly.

It should be noted that to produce the desired results and also to obtain the best time factor, several operational variables can be adopted when dealing with ferrous or non-ferrous metals. These variable conditions are:—(1) Air pressure; (2) amount of abrasive mixed with water or emulsion; (3) angle of projection; (4) nozzle size; (5) proximity of nozzle to object; and (6) nature of the fluid. For the convenience of handling parts to be processed, automatic conveyors, turntables, fixtures and belts can be used with advantage, but obviously the exact arrangement would be designed to suit the particular job.

House Organs

Crucible Cast Steel. Issued by John Vessey & Sons, Limited, Brunswick Steelworks, Denby Street, Sheffield, 2.

A well-produced 26-page booklet, dedicated to friends in the trade, traces the history of steelmaking from Huntsman's time. This short monograph endeavours to deal, in simple language, with a complex subject in the hope that it may give some indication of the importance of crucible steel for various products.

One Hundred and Eleven. The quarterly staff magazine of the Hammond Lane Foundry Company, Limited, Dublin. The contents include a brief article on the neutral oxy-acetylene flame, a simple review of the alloys of copper and personal items associated with the associated companies.

Founders Company Fellowships

The Worshipful Company of Founders of the City of London, to whom Ordinances were granted as long ago as July 29, 1365, was originally formed for the purpose of ensuring that work by founders in the City of London should only be with good metal. The Company believe that the development and progress of founding and the science of metallurgy must depend very largely on attracting to the industry highly trained men of evident talent. To that end the Company awards Fellowships so as to give facilities for advanced education to men who have already completed their normal course of training. Such training to have been at a University or to be at least of a high educational standard.

These Fellowships, which are called "Founders Company Fellowships," are available to those candidates who appear likely to be able to make good their careers in the founding industry if afforded the facilities for further courses of study designed specially to qualify them towards that end. Fellows are chosen by a Selection Committee from among applicants who have completed such training as mentioned above, in chemistry, physics, metallurgy (more especially in connection with molten metal) and allied sciences. In addition to this, some previous practical foundry training and experience together with, if and when possible, the Diploma of the British Foundry School would carry weight with the selection committee. At the same time the Committee pays considerable attention to the character and powers of initiative of the candidate.

The course to be followed by the Fellow will in each case be chosen with the object of adding to his scientific equipment that which appears to be most necessary for adapting him to some branch of the founding industry. There will be no limitation to the nature of the course which may be selected; it might include research, a period in works or foreign experience; due regard being paid to the particular wishes and aptitude of the Fellow. The normal value of the Fellowship is £300 per annum and it will be renewable for a second year and in special cases for a third year. Payment will be made monthly in advance to the Fellow's bank.

One Fellowship is granted each year so that in ordinary circumstances there are two Fellowships in existence. The Fellow will be expected to devote his whole time to work approved by the Company and to submit if required periodical reports of progress. No other work for which payment would be received shall be undertaken by him without the consent of the Master of the Company and no other grant, Scholarship or Fellowship shall be held concurrently with the Fellowship unless the Selection Committee approve.

Candidates, who should not be less than 21 years of age on September 1 of the year of application, will be required to furnish particulars of their name, address, age, academic and/or other training, etc., etc. They will subsequently be required to attend before the Selection Committee.

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The tenure of the Fellowship dates from September 1. Applications must be received not later than May 1 by the Clerk of the Worshipful Company of Founders, Founders' Hall, 13, St. Swithin's Lane, E.C.4, to whom all inquiries should be addressed. The Company does not bind itself to award a Fellowship in any one year.

Securing Cores

By "Tramp"

The ideal way of securing cores is to have the core print of sufficient size and the core prepared to suit, so that adequate anchorage is obtained to prevent movement during casting. Oftimes patterns and core-boxes are despatched to the foundry without adequate thought having been given to this important point, with the result that the moulder is obliged to use methods which are far from ideal and sometimes form the subjects of complaints from the customer. This was particularly noticed recently when a number of castings were rejected because of slight surface blemishes after machining.

Fig. 1 illustrates the way in which a defect is caused through inserting moulders' brads along the edge of a core to hold it in position. This particular core was assembled in the mould in the position shown and held by a number of brads as A, Fig. 1, face B being the face of the casting. A better way of holding these cores would be to have a hole through the print portion at C and insert a flat-head nail through it into the mould. In this particular case, had the core print been of sufficient size the core could have been adequately secured by the balance imparted to it and further security could be obtained by the use of an adhesive on the print portion coming into contact with the mould.

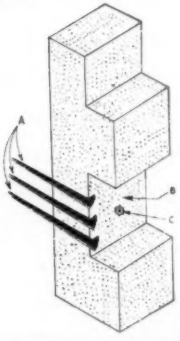


FIG. 1.—"RIGHT" AND "WRONG" METHODS OF SECURING A CORE.

MUREX WELDING PROCESSES, LIMITED, of Waltham Cross, Herts, have developed and placed on the market a line of covers made of Perspex for protecting the coloured glasses mounted in welders' helmets from metallic splashes. As an aid to good welding they appear to have much to commend them.

Publications Received

The Scientific Research Department of the L.M.S. Published by the London Midland & Scottish Railway.

The purpose of this brochure is as a souvenir gift for visitors to the laboratories at Derby and elsewhere. It is desirable that this should be done, because it enables the company to stress that the research work undertaken is not confined to laboratory investigations, but embraces much "field" work or, more truthfully, work along the main lines, sidings, and in the warehouses.

Foundryman's Compendium. Published by Foundry Services, Limited, Nechells, Birmingham. Price, leather bound, 7s. 6d.; board cover, 5s.

This book has assembled in its 100-odd pages a vast amount of well chosen and reliable data of direct interest to the practical foundryman. There is one table which the reviewer would like to see incorporated in the next edition, and that is one for converting from 22,400 to 134,400 lb. into tons, as, when handling American technical data, it is tiring to keep on dividing by 2,240.

A nice balance has been maintained between the requirements of the ferrous and non-ferrous foundrymen. The only criticism the reviewer has to make is that the first ten pages should be transferred to the end of the book. Beyond that the book is strongly recommended as a worth-while purchase for the practical men within the industry.

Specifications for Aluminium and Aluminium Alloy Products. Issued by the Northern Aluminium Company, Limited, Lancaster Place, London, W.C.2.

The first edition of this most useful publication reached us in the dark days of October, 1940. Since that time its popularity has demanded several reprints, the previous one being in 1943. In recent years there have been so many changes that this new and enlarged edition was warranted. It carries a spiral binding and a smart black and metallic cover. It now takes 3½ pages to list all the specifications, and the correlation of the casting alloys with their trade names takes a matter of eleven more. The reviewer wonders why, when the trade names are given, the names and addresses of the makers are not included as an appendix. However, they are not too difficult to locate by interested parties. Users of aluminium in any form will be gratified to the compilers for the arrangement of such a vast amount of interesting data. A covering letter points out that if there be any omissions or errors the issuing house will be glad to rectify them in the next issue.

Rubber Developments. Vol. I, No. 2. December, 1947. Published by The British Rubber Development Board, Mark Lane, London, E.C.3.

This number has a certain interest for foundrymen, as it carries an article by Mr. W. H. Stevens on the moulding and casting of articles in rubber. The general interest features have been well chosen and they will be accorded approbation by the average technically-minded reader.

New Catalogues

Foundry Materials and Requisites.—British Foundry Units, Limited, of Retort Works, Chesterfield, have assembled a number of leaflets into a stiff blue binder. These, with a foreword, make quite a useful catalogue of a wide range of requisites a number of which are in short supply. The job of displaying pictures of brushes, bellows and shovels to conform with modern ideas is not easy. Yet for the purposes of supply it is essential. Still, the usefulness of the catalogue could have been improved by giving a code number to each item to facilitate correspondence and the placing of orders. These remarks do not apply, of course, to materials such as core oils and fluxes. The catalogue is essentially of a utilitarian character and is well worthy of a permanent place in the files of business literature as assembled by the foundry industry.

Testing Equipment for Foundry Sands. Ridsdale & Company, Limited, of 234, Marton Road, Middlesbrough, have just issued a 33-page, well illustrated, loose-leaf brochure which lists and describes most of the standard equipment currently used by British foundries in connection with sand control. This is excellent throughout, except for the front jacket, whereon it is suggested that the large size type reading "Foundry Sand" and the smaller type reading "Testing Equipment" might be interchanged, for it is the latter which requires emphasis. Every foundry concern should possess this catalogue, as the material dealt with is almost an essential for the proper conduct of a modern foundry.

Metallic Abrasives.—Accompanying a leaflet issued by Harrison Bros. (England), Limited, Atlas Foundry, Commercial Street, Middlesbrough, which illustrates and describes their range of chilled shot and grit (Diamond Brand), was a "pair of spectacles." These, it is suggested, should be used in viewing a two-coloured chart accompanying the gadget for showing-up stereoscopically the grain size of abrasive. The gadget works excellently and should be useful in specifying the grade sought.

Book Review

Planning Factory Maintenance, by F. D. Denner. Published by Emmott & Company, Limited, 31, King Street West, Manchester, 3. Price 1s. 6d.

The appearance of this little book at the present time is most appropriate, as manufacturers, like housewives, have, from now on, to mend and make do. It is postulated that for daily and weekly machine maintenance jobs a standard time can be evolved and by the exercise of a little simple arithmetic the number of men required for the complete upkeep staff can be calculated. Moreover, the author states that it works out in practice. The book touches upon the difficulties of incentive payments and suggests a system, which appears to be workable for the larger plants. The author has made a really worthwhile attack upon a subject bristling with difficulties.

V.C.F.

Parliamentary

Conditions and Output in Foundries

MR. ELLIS SMITH asked the Minister of Labour if regulations were to be issued based upon the Garrett Report in order that conditions and output might be improved in the ironfoundries; was further research being conducted; when was the report to be published and would early action be taken to deal with dust in steelfoundries; and if it was intended to deal with non-ferrous foundries.

In reply, MR. ISAACS said he assumed that Mr. Smith had in mind the Report of the Joint Advisory Committee on Conditions in Ironfoundries under the chairmanship of the late Mr. H. E. Chasteney, which was published last summer, and which contained a number of recommendations for the progressive improvement of general working conditions and of health and welfare services and amenities. It was not proposed, at any rate for the time being, to make statutory regulations based on the report; but the recommendations had been widely publicised and, in accordance with a suggestion made in the report, a Standing Joint Committee had since been set up under the chairmanship of a Deputy Chief Inspector of Factories, to keep under review conditions and developments in the industry. This Standing Committee would form a ready means of consultation between the Chief Inspector of Factories and the two sides of the industry on questions arising in connection with the practical implementation of the recommendations contained in the report. The recommendations of the Committee on Dust in Steelfoundries had been followed up, but the implementation of some of them gave rise to serious technical difficulties. Working conditions in non-ferrous foundries were not being overlooked; but he was not aware of any special dangers to health or safety which required exceptional consideration.

Limestone and Lime Production

Production of limestone in 1947 totalled 14,550,000 tons, compared with 20,700,000 tons in 1939. Production of lime from limestone last year was 1,525,000 tons, but no figure is available for 1939. Giving this information in a written answer to MR. MOLSON, the MINISTER OF TRANSPORT (Mr. Barnes) pointed out that the 1939 figure includes limestone produced by quarries belonging to or operated on behalf of iron and steel manufacturers, whereas the figures for 1947 are exclusive of this. The figures for 1947 are approximate. Complete returns are not yet available.

The Minister stated that the limestone production in 1947 was distributed as follows:—Iron and steel manufacture, 1,235,000 tons; agriculture, 895,000 tons; limestone for lime burning, 3,050,000 tons; other purposes, including roads, railway ballast, building and constructional purposes and collieries, 9,370,000 tons. Lime from limestone: Steel manufacture, 395,000 tons; agriculture, 500,000 tons; building, 265,000 tons; other purposes, 365,000 tons.

Scrap-iron Exports

MR. PRITT, who asked the Secretary of State for Foreign Affairs what quantities of scrap iron were exported from the Anglo-American zone of Germany, or collected therein for export, in each of the four quarters of 1947; what prices were fixed therefor; in what currencies; and to what countries and consignees they were sent or to be sent, was told by MR. MCNEIL that a quarterly breakdown of commercial scrap exports from the combined zone was not available, but exports in 1947 consisted of:—19,075 tons to Belgium—consignee, Office de Récupération Economique; 4,174 tons to Czechoslovakia—consignee, Ceskoslovenska Huette Narodny Podnik; 142,527 tons to United Kingdom—consignee, Iron & Steel Disposals, Limited. Prices to Belgium and Czechoslovakia were fixed in dollars and to the United Kingdom in sterling. It would not be in the public interest to disclose the actual prices paid.

Steel Priority Scheme Responsibility

The PRIME MINISTER told MR. ERROLL that general questions connected with the arrangements for the limited use of priority symbols to implement steel allocations should be addressed to the Chancellor of the Exchequer, under whose supervision the interdepartmental machinery for the allocation of steel supplies operated. Individual authorisations for the use of the priority symbol were the responsibility of the various departments concerned.

Steel Scrap Supplies

In a written answer to MR. SCOTT-ELLIOT, the MINISTER OF SUPPLY (Mr. G. R. Strauss) said the current rate of scrap deliveries to steelworks was higher than a year ago. Stocks were, however, lower. A special appeal had been made to industry for the maximum possible release of scrap, while this was being supplemented by intensified efforts to secure additional supplies from surplus equipment and stores and by imports from Germany and elsewhere.

Gazette

FIDELITY ENGINEERING COMPANY, LIMITED, is being wound up voluntarily. Mr. C. L. Walker, 23A, St. James's Street, London, S.W.1, is the liquidator.

NEW BRIGHTON TOWER ENGINEERING COMPANY, LIMITED, is being wound up voluntarily. Mr. R. McNeil, 43, Church Road, Hove, Sussex, is the liquidator.

THE INTERNATIONAL ALUMINIUM COMPANY, LIMITED, is being wound up voluntarily. Mr. L. H. Norman, 3, Fredericks Place, Old Jewry, London, E.C.2, is the liquidator.

THE PARTNERSHIP BETWEEN Jabez Percival Squire and Alfred Flemming, carrying on business as lock makers under the style of the Regal Lock & Engineering Company, at Bray Street, Willenhall, Staffs, has been dissolved by mutual consent. The business will be carried on by J. P. Squire.

Non-ferrous Scrap Metal Prices

Revised List of Quotations

The following prices of non-ferrous scrap metals have been announced by the Ministry of Supply. The prices are for scrap metal at Ministry of Supply depots at which the Minister is prepared to effect a sale to a buyer subject to having sufficient material of that particular quality available at a convenient depot at any particular time. The list refers to delivery within the current and next three calendar months, but is published without prejudice or commitment. Without notice the schedule of materials may be amended in the light of changing circumstances, and prices may be altered in accordance with market conditions, production costs, and other factors. Publication of the prices does not constitute an offer of sale. The following prices are per ton, ex-works:—

COPPER—Clean untinned, cut up, £124; shell-band scrap (other than turnings), £124; copper turnings (including shell-band turnings), £112.

ZINC—Zinc scrap, £63 10s.

ZINC ALLOY—Zinc alloy die-cast scrap, £70.

BRASS—S.A.A. webbing, £104; defective cups and cases, £103; cut-offs and trimmings, £97 10s.; muffled and/or mechanically-treated cases, £100; turnings, loose, £89 10s.; Q.F. webbing, £105; Q.F. cut-offs and trimmings, £103; Q.F. defective cups and cases, £105; Q.F. turnings, £90 10s.; other 70/30 process and manufacturing scrap, £101 10s.; 60/40 rod swarf, £82 10s.; process and manufacturing scrap containing over 62 per cent. and up to 68 per cent. copper, £96 5s.; broken-down fuse scrap 60/40 and/or 60/40 brass rod of 1½ in. dia. and over, £93; 90/10 gilding metal webbing, £116 10s.; 90/10 gilding metal defective cups and envelopes before filling, £114.

Scrap gilding metal bullet envelopes (maximum antimonial lead content 4 per cent.), £100 10s.; scrap cupro-nickel bullet envelopes (maximum antimonial lead content .08 per cent.), £116; brass cartridge metal strip, £106; brass scrap 70/30 ingots, £106.

Stock and Sales of Non-ferrous Scrap

The Ministry of Supply announces that the stock of non-ferrous scrap on charge on December 31 was 52,710 tons, made up as follows:—S.A.A. cases, 4,750 tons; copper and copper alloy, 13,989; zinc and zinc alloy, 7,398; lead and lead alloy, 5,934; other grades, 20,639 tons.

Sales for the three months' period October to December amounted to 13,274 tons (approximate value £1,250.000). The analysis was as follows:—S.A.A. cases, 6.767 tons; copper and copper alloy, 5,671; zinc and zinc alloy, 350; lead and lead alloy, 68; other grades, 418 tons.

Material put out to tender during the period amounted to 6,704 tons, of which 50 tons were lead. During the October-December period, 13,672 tons were invoiced, the value being £1,175,052.

United Kingdom Tin Position

The Ministry of Supply has released the following figures showing the United Kingdom tin position for the month of December:—

		Ministry.	Consumers.
		Long tons.	Long tons.
TIN METAL:			
Stocks at December 1		6,326	2,798
Arrivals		—	—
Production		2,313	—
		8,639	2,798
Deliveries:			
To U.K. consumers	2,326	—	2,326
For export	125	2,451	—
		—	5,124
Consumption		—	2,346
Stocks at December 31		6,188	2,778*
TIN ORE (Tin content):			
Stocks in U.K. at December 1		6,792	—
Stocks in U.K. at December 31		6,357	—

* Calculated. Reported 3,016 tons.

Provisions of New Exchange Control Order

Under the Exchange Control (Payments) (French Franc Area) Order, 1948 (S.I. 1948, No. 90), which came into operation on February 3, a class of sterling accounts known as "French No. 1 Accounts," is established. These are accounts of the French Government or of the Government of any other territory in the French Franc Area, or of a *banque agrée* (authorised bank). The Order provides that transfers from other French accounts (which are designated "French No. 2 Accounts") may only be made, except by special permission, to a French No. 1 Account, and that payment for exports from the U.K., if made in sterling and not in one of the currencies of the French Franc Area, must be made from a French No. 1 Account.

The effect of the Order is to ensure that movements of sterling in French hands are made through accounts closely controlled by the French Government or the government of any other part of the French Franc Area. It has been made after consultation with the French authorities, and with their full agreement.

Power Plant in 1947

A total capacity of 465,500 kw. of heavy electrical plant was manufactured and erected during 1947, says the Ministry of Supply. Of this plant sufficient was brought into service by the Central Electricity Board by December 31, 1947, to supply an additional 340,000 kw. to the grid—an increase of 35,000 kw. on the additional power supplied to the grid in 1946. In addition, repair work completed during the last nine months of 1947 amounted to the equivalent of 1,293,000 kw., of which 586,000 kw. were done in the last six weeks of the year. The capacity of the plant undergoing major repairs at the end of the year totalled 475,000 kw.

Personal

MR. P. P. MACDIARMID has been appointed a director of Meters, Limited, Manchester.

MR. J. R. HUTCHINSON has been elected a director of the Wallis Tin Stamping Company, Limited, Poole, Dorset.

SIR FRANCIS P. NOSWORTHY has been appointed a director of Chinese Engineering & Mining Company, Limited.

MR. J. W. HARRISON, managing director of the Darlington Rolling Mills Company, Limited, has been elected to the Town Council.

MR. THOMAS YOUNG, 33, York Place, Edinburgh, has been appointed secretary of Edinburgh and Leith Metal Merchants' Association.

MR. J. W. RIDGEWAY, of the Edison Swan Electric Company, Limited, has been elected chairman for the current year of the Radio Industry Council.

MR. THOMAS TINSLEY, superintendent shipwright of Grayson, Rollo & Clover Docks, Limited, Liverpool, has retired. He had been with the company for 54 years.

MR. J. C. M. SHECKELL has been appointed an additional director of T. M. Birkett & Sons, Limited, engineers and non-ferrous founders, etc., of Stoke-on-Trent.

MR. T. B. WORTH, late head of the production engineering section of Birmingham Central Technical College, has been appointed education officer to the Institution of Production Engineers.

MR. A. J. HARTLEY, a director of Hartley (Stoke-on-Trent), Limited, sewage machinery specialists, ironfounders, etc., has been adopted as chairman of the Stone Urban District Council for the coming year.

MR. H. E. LANE, chief buyer of Fischer Bearings Company, Limited, has received a presentation from the management of the company and the workpeople to mark his year of office as Mayor of Wolverhampton.

MR. W. E. A. CULLUM, previously production manager at the factory at Cowley, Oxford, of Morris Motors, Limited, has become general manager. MR. J. R. WOODCOCK succeeds Mr. Cullum as production manager.

MR. SYDNEY OMBLER, assistant secretary of the Ship Constructors' and Shipwrights' Association, Newcastle-upon-Tyne, has been appointed secretary in succession to MR. JOHN WILLCOCKS, who retires at the end of March.

MR. CHARLES E. CHANDLER, of Baxendale & Company, Limited, Manchester, was appointed chairman for the ensuing year at the annual meeting of Edinburgh and Leith Metal Merchants' Association held recently.

MR. J. J. W. MIDDLEMISS, assistant engine works manager of John Readhead & Sons, Limited, South Shields, has received a presentation to mark the occasion of his leaving the company to take up another appointment.

MR. N. E. KEARLEY, Deputy Director of the Council of Industrial Design, resumed duty on February 1 with the Ministry of Supply, in the electrical plant division, having completed his period of loan to the Council from the civil service.

WING-COMM. J. B. R. BROOKE, general manager of the Normanby Park Steelworks, Scunthorpe, of John Lysaght, Limited, is leaving the company. He will be succeeded by MR. WILLIAM JAMES, of John Summers & Company, Limited, Shotton, Ches.

SIR PERCY LISTER, chairman and managing director of R. A. Lister & Company, Limited, agricultural and general engineers, and ironfounders, of Dursley, Glos, was among the passengers in the Queen Elizabeth which sailed for New York on February 4.

MR. R. CECIL SMART, consulting engineer, of Birmingham, was awarded the Nursey Premium at the inaugural meeting of the Society of Engineers on February 2. The award was made for his Paper on "Industrial Organisation as a Factor in Productive Efficiency."

SIR MARK HODGSON is to retire from the general secretaryship of the United Society of Boilermakers and Iron and Steel Shipbuilders. A dinner was given by the Confederation of Shipbuilding and Engineering Unions yesterday (Wednesday) to mark the occasion.

THE HON. FRANCIS H. BALFOUR, a director of Arthur Balfour & Company, Limited, steel and tool makers, of Sheffield, has been appointed vice consul for Denmark in Sheffield and district in succession to his father, LORD RIVERDALE, who has held that office since 1899.

MR. A. GRIFFITHS, formerly with the Ford Motor Company, Limited, has been appointed a director and general manager of F. Perkins, Limited, Diesel-engine manufacturers, of Peterborough. MR. R. FERGUSON has been appointed a consultant director of the company.

MR. E. C. RUFFLE, formerly a director of Morris Motors, Limited, and managing director of Morris Commercial Cars, Limited, who recently resigned from the Nuffield organisation, has agreed to join the board of Wellworthy Piston Rings, Limited, as commercial director.

MR. W. H. LITTLETON, who for the last 25 years has represented J. W. Jackman & Company, Limited, manufacturers of foundry plant and requisites, etc., of Manchester, in the London area, has retired. He was trained as a draughtsman, and during the 1914-18 war was engaged on the designing of electric furnaces. He has been an associate member of the Institute of British Foundrymen since 1922.

MR. G. WILSON, managing director of Raleigh Industries, Limited, has been elected president of the British Cycle and Motor Cycle Manufacturers' and Traders' Union for the fourth year. MR. C. D. TERRY, of Herbert Terry & Sons, Limited, manufacturers of springs and presswork, of Redditch, and MR. J. Y. SANGSTER of Triumph Engineering Company, Limited, have been elected vice-presidents for the third time.

British Blast Furnaces in the December Quarter, 1947

These tables are published through the courtesy of the British Iron and Steel Federation.

Derby, Leicester, Notts, Northants and Essex.

Name of firm	In blast January 3, 1948, making:				Weekly average in blast		Total built	Furnaces relining
	Hematite	Forge and foundry	Basic	Total	Dec. quarter	Sept. quarter		
Clay Cross	—	1	—	1	1	1	1	—
Ford Motor	—	1	—	1	1	1	1	—
Kettering Coal & Iron	—	1	—	1	1	1	2	—
New Cransley Iron & Steel	—	1	—	1	1	1	2	1
Renishaw Iron	—	1	1	2	2	2	2	—
Sheepbridge Coal & Iron	—	2	—	2	2	2	2	—
Stanton Ironworks: Holwell	—	3	—	3	3	3	5	1
Stanton Gate	—	4	—	4	4	4.8	5	1
Staveley Coal & Iron	—	3	1	4	3.3	4	4	—
Stewarts and Lloyds: Corby	—	—	4	4	4	4	4	—
Wellingboro' Iron	—	1	1	2	2	2	3	1
Total	—	18	7	25	24.3	25.8	31	4

Lancashire (excl. N.-W. Coast), Denbigh, Flint and Cheshire.

Brymbo Steel	—	—	1	1	1	0.9	1	—
Darwen & Mostyn	—	—	—	1*	1	1	1	—
Lancashire Steel Corp'n.	—	—	2	3†	2.7	2	4	1
Total	—	—	3	5	4.7	3.9	6	1

* Producing ferro-manganese. † Includes ore producing ferro-manganese.

North-West Coast.

Barrow Hematite	2	—	—	2	2	2	4	1
Charcoal Iron	—	1	—	1	1	0.3	1	—
Millom & Askam	2	—	—	2	2	2	3	1
North Lonsdale	—	—	—	—	—	—	4	—
Workington Iron & Steel	2	—	—	2	2	2	3	1
Total	6	1	—	7	7	6.3	15	3

Lincolnshire.

Appleby-Frodingham	—	—	8	8	7.9	6.5	9	—
Lysaght, J.: Scunthorpe	—	—	3	3	3	2.9	4	1
Thomas, R., & Baldwins: Redbourn	—	—	2	2	2.1	2	2	—
Total	—	—	13	13	13	11.4	15	1

North-East Coast.

Cargo Fleet Iron	—	—	2	2	2	2	2	—
Consett Iron	1	—	1	2	2	2.1	2	—
Dorman, Long: Acklam	—	—	3	3	3	3	4	1
Redcar	—	—	2	2	2	0.1	2	—
Cleveland	—	—	4	4	4	3.5	5	—
Bessemer	—	—	2	2	2	3	3	1
South Bank	—	—	—	2*	2	2	4	—
Grangetown	—	—	—	—	—	—	2	—
Gjers, Mills & Co.	2	—	—	2	2	2	5	—
Pease & Partners	2	—	—	2	2	2	3	1
Skinningrove Iron	—	—	2	2	2	2	2	—
South Durham Steel & Iron	—	—	2	2	2	2	3	—
Total	5	—	18	25	25	23.7	37	3

* Producing ferro-manganese.

Scotland.

Bairds & Scottish Steel: Gartsherrie	1	1	2	4	4	4	5	—
Carron	—	1	—	1	1	1	4	1
Colvilles	—	—	2	2	2	2	3	—
Dixon, Wm.: Govan	—	2	—	2	1.5	1	6	—
Total	1	4	4	9	8.5	8	18	1

Increases of Capital

Details of increased capital have been announced by the following companies:—

Oddys (Engineers), Limited, 2, Lovell Road, Leeds, increased by £1,000, in £1 shares, beyond the registered capital of £2,000.

H. A. V. Hatfield (Worcester), Limited, engineers, etc., of Derby Road, Worcester, increased by £2,000, in £1 shares, beyond the registered capital of £2,000.

Trent Foundries, Limited, Knutton Road, Wolstanton, Stoke-on-Trent, increased by £3,500, in £1 ordinary shares, beyond the registered capital of £1,500.

Light Fabrication, Limited, engineers and fabricators, etc., Victoria Street, Consett, Co. Durham, increased by £4,000, in £1 shares, beyond the registered capital of £1,000.

Star Engineering Company (Worcester), Limited, 8, Star Lane, Bransford Road, Worcester, increased by £2,000, in £1 ordinary shares, beyond the registered capital of £3,000.

W. G. Walker & Company (Engineers), Limited, 2, Emery Hill Street, London, S.W.1, increased by £6,000, in 6,000 6 per cent. redeemable cumulative preference shares of £1 each, beyond the registered capital of £4,000.

THE TYNE'S FIRST LAUNCH of the year was the Norwegian ship Viktun (8,000 tons), built by John Readhead & Sons, Limited, South Shields, for the Panama City Tanker Corporation.

Tin Study Group Meets

A meeting of the Management Committee of the Tin Study Group was held at The Hague recently under the chairmanship of M. Th. Heyse (Belgium). The countries represented were:—Belgium, Bolivia, the Netherlands, the United Kingdom and the United States. It is understood that much of the business of the Committee was concerned with matters of organisation of the secretariat and its statistical section, including the issue of the monthly statistical bulletin.

World tin-ore production last year is estimated at 113,000 tons and world consumption at 131,600 tons in the first statistical bulletin of the Study Group which has been issued from The Hague. The difference represents reduction in world stocks, and consumption of certain stocks found at the end of the war in the Far East.

Annual tin production in Malaya (on the basis of the November output) was at a rate of 40,000 tons, and in the Netherlands Indies was at a yearly rate of 21,000 tons, both about half of pre-war. Bolivian exports at an annual rate of 32,000 tons were below wartime levels, but above pre-war. Malayan output of tin concentrates during December was 3,390 tons.

World stocks of tin metal and tin in ore at the end of September (latest figures available) showed some increase over earlier months, due to high receipt of Bolivian tin ore in the United States during August, and to the higher figure of tin ore afloat to the U.K. during September.

British Blast Furnaces in the December Quarter, 1947—*cont.*

Staffordshire, Shropshire, Worcestershire and Warwickshire.

Name of firm	In blast January 3, 1948, making:				Weekly average in blast		Total built	Furnaces relining
	Hematite	Forge and foundry	Basic	Total	Dec. quarter	Sept. quarter		
Golden Irondale	—	1	—	1	1	1	2	1
Grazebrook, M. & W.	—	—	—	—	—	—	2	—
Lilleshall	—	1	—	1	1	1	2	1
Round Oak Steelworks	—	1*	—	1	1	1	3	—
Shelton Steel & Iron	—	—	3	3	2.1	2	3	—
Stewarts and Lloyds: Bilston	—	—	2	2	2	1.2	3	—
Thomas, G. & R.	—	—	—	—	—	—	2	—
Total	—	3	5	8	7.1	6.2	17	2

* Cold-blast pig-iron.

South Wales and Monmouthshire.

Guest, Keen, Baldwins: Briton Ferry	—	—	—	—	—	—	1	—
Cardiff	1	—	2	3	2.9	2.9	4	—
Steel Co. of Wales: Margam	—	—	2	2	2	2	3	—
Thomas, R., & Baldwins: Ebbw Vale	—	—	2	2	2	2	3	1
Total	1	—	6	7	6.9	6.9	11	1

Sheffield.

Park Gate Iron & Steel	—	—	1	1	1	1	2	—
GRAND TOTAL	13	26	57	100*	97.5	93.2	152	17

* Includes four making ferro-alloys.

Number of Furnaces in Blast on January 3, 1948

District	Weekly average in blast, Dec. quarter	Total in blast on Jan. 3, 1948	In blast on January 3, making:			
			Hematite	Forge and foundry	Basic	Ferro-alloys
Derby, Leics., Notts, Northants and Essex	24.3	25	—	18	7	—
Lancs. (excl., N.-W. Coast), Denbigh, Flint and Ches.	4.7	5	—	—	3	2
Lincolnshire	13	13	—	—	13	—
North-East Coast	25	25	5	—	18	2
Scotland	8.5	9	1	4	4	—
Staffs., Shrops., Worcs. and Warwick	7.1	8	—	3	5	—
S. Wales and Monmouth	6.9	7	1	—	6	—
Sheffield	1	1	—	—	1	—
North-West Coast	7	7	6	1	—	—
Total	97.5	100	13	26	57	4

Weekly Average Number of Furnaces in Blast During the Previous Six Quarters

District	1947			1946		
	Sept.	June	March	Dec.	Sept.	June
Derby, Leics., Notts., Northants and Essex	25.8	23.6	24.7	25.8	23.5	22.2
Lancs. (excl. N.-W. Coast), Denbigh, Flint and Ches.	3.9	4	3.9	3.9	4	4.5
Lincolnshire	11.4	10.7	11.6	11.8	13	12.9
North-East Coast	23.7	23.2	25.5	26	26	25.8
Scotland	8	8	10.2	10.2	10	10
Staffs., Shrops., Worcs. and Warwick	6.2	4.4	4.2	5.8	7.8	8
S. Wales and Monmouth	6.9	6.9	6.8	6.9	6.6	6.8
Sheffield	1	1.8	1	1	1	1.4
North-West Coast	6.3	6.4	6.8	6.8	5.8	6.6
Total	93.2	89	94.7	98.2	97.7	98.2

The following companies have furnaces in course of construction:—Cargo Fleet, 1; Clay Cross, 1 Darwen & Mostyn, 1; Lancashire Steel Corporation, 1.

News in Brief

THE FIRST TYNE-BUILT SHIP to be handed over this year is the 700-ton motor coaster Faience built by Clelands (Successors), Limited.

TELEGRAPH CONDENSER COMPANY, LIMITED, North Acton, London, W.3, reports that during 1947 the company's products were shipped to 47 countries.

DANISH, NORWEGIAN AND FINNISH STUDENTS who are coming to this country for a shipbuilding course arranged by the British Council, are to visit Tyne and Glasgow shipyards.

TWO VESSELS launched at Sunderland recently were the 2,525-ton Hemseljell, built by John Crown & Sons, Limited, and the cargo liner Pacific Unity (10,500 tons), built by Sir James Laing & Sons, Limited.

THE FINANCIAL YEAR of the Renold & Coventry Chain Company, Limited, and those of its subsidiaries, will in future end nominally on March 31. The current short transition "year" will end on April 4 next.

A STATEMENT ISSUED by the Foreign Office, at the conclusion of the Anglo-Italian economic talks in London, forecasts a substantial flow of goods between Italy and the United Kingdom during 1948.

VICKERS-ARMSTRONGS, LIMITED, Newcastle-upon-Tyne, has acquired the sole manufacturing and selling rights of the Kelly letterpress from American Type Founders, Inc., New Jersey. The company will begin manufacture immediately.

SHAREHOLDERS OF Brooks & Doxey (Holdings), Limited, formerly associated with Textile Machinery Makers, Limited, will meet at Manchester on February 19 to consider a scheme of capital reconstruction proposed by the directors.

MORRIS MOTORS, LIMITED, has decided to abandon its tenancy of the extensive Government factory at Urlay Nook, Eaglescliffe, near Darlington, which for some time past has been used as a depot for the recovery of aluminium from aircraft scrap.

TWO GERMAN STEEL EXPERTS are to spend several weeks on the technical and research staff of Jarrow Metal Industries, Limited. The proposal has been arranged under a scheme planned by the British Government and the British Iron and Steel Federation.

CHARLES RICHARDS & SONS, LIMITED, manufacturers of nuts and bolts, etc., of Darlaston, is having to refuse orders at the rate of one in every four received because of shortage of raw materials. The works joint consultative council has decided to make representations to the Minister of Supply.

BETWEEN 500 and 600 shipyard electricians employed by Harland & Wolff, Limited, at Belfast, stopped work at lunchtime on February 3. At a meeting during the afternoon, dissatisfaction was expressed with the rate of payment, and it was decided to demand a 40 per cent. increase in wages and give 21 days' notice of intention to strike.

RECOMMENDATIONS WHICH WOULD reduce the gap between the rising European demand for silica bricks and the present insufficient production, if they are adopted by the governments concerned, were made at the recent meeting in Geneva of a Working Party on Silica Bricks appointed by the Industry and Materials Committee of the Economic Commission for Europe.

SHAREHOLDERS OF Vab Products, Limited, brassfounders, of Kingsway, London, W.C.2, will meet on February 19 to consider a resolution to convert the 10,000 6 per cent. non-cumulative redeemable participating preference £1 shares into 6 per cent. cumulative preference shares, with effect from January 1, 1948. It is also proposed to increase the authorised capital from £210,000 to £275,000 by creating 65,000 6 per cent. cumulative preference £1 shares and to amend the articles of association.

CROMPTON PARKINSON, LIMITED, manufacturing electrical engineers, has started a scheme to provide annually bursaries for selected applicants. The scheme comprises "Crompton Bursaries" for employees of exceptional promise to obtain further education and training to fit them for advancement in the company's service, and "Parkinson Empire Bursaries" to enable engineering graduates of Australia, New Zealand and India to obtain practical and technical experience and training in the company's workshops in Great Britain.

DAVY & UNITED ENGINEERING COMPANY, LIMITED, is pushing forward with its £1,000,000 extension and reorganisation programme at its Sheffield and Glasgow works. Capacity will be increased by a third. At the Darnall Works, Sheffield, a new erecting shop, 420 ft. long and 90 ft. wide, is partly in use. The existing erecting shop is to be re-equipped as an additional heavy machine shop and the ironfoundry modernised. At the Park Iron Works, Sheffield, there is to be a new smith's shop and large-scale replacement of machine tools.

MR. I. M. LYON, works manager of Babcock & Wilcox, Limited, boiler makers, engineers, etc., of Renfrew, recently told Glasgow industrialists that there was no justification for the claims that production per man-hour during the second world war was higher than before the war. In their own works he had examined the records and found there was a tendency for production to fall pretty steadily during the war. This, however, was only to be expected as much of the work was unfamiliar. He added that since the war production per man-hour had risen fairly steadily, and last year it stood at 98 per cent., compared with the pre-war figure.

A NUMBER OF EXPORTERS has commissioned the British Export Trade Research Organisation to find the answers to a number of problems in connection with their businesses in the Middle East. Mr. Wilfred Sloane will leave early in March with a long list of questions to answer, market data to assemble, policies to discuss, agents to visit and recommend, price structures to check, conditions to investigate, and forms of advertising to suggest. Mr. Sloane has lived most of his life in Turkey and other countries of the Middle East. His services are available to all exporters and further information can be obtained from the secretary, B.E.T.R.O., 48, Dover Street, London, W.1.

New Trade Marks

The following applications to register trade marks appear in the "Trade Marks Journal":—

"FLEXEND"—Arc-welding electrodes of metal. ROCKWELD, LIMITED, Commerce Way, Croydon.

"RENWAY"—Articles of common metal or common-metal alloys. RENFORTS, LIMITED, Eagle House, Jermyn Street, London, S.W.1.

"ROLAVEYOR"—Conveyors (machines). J. COLLIS & SONS, LIMITED, 42 and 43, Regent Square, Gray's Inn Road, London, W.C.1.

"MOTAVEYOR"—Conveyors (machines). J. COLLIS & SONS, LIMITED, 42 and 43, Regent Square, Gray's Inn Road, London, W.C.1.

"MICROMAX"—Precision lathes and precision milling machines. NORMAN SIMPSON, 7, Kelham Green, Gordon Estate, Nottingham.

"FANCIORUM"—Unwrought and partly-wrought common metals, etc. WINIFRED MAY WALLER, 28, Kingsfield Road, Oxhey, Watford.

"PORTMAC"—Ammeters, speed and pressure indicators. BROADWAY (BRISTOL) ENGINEERING COMPANY, 67, Wellington Hill West, Bristol.

"SYNCHROMO"—Braking systems and steering gear, etc. B. & P. SWIFT, LIMITED, Swift Works, North Circular Road, London, N.W.10.

"CHILCO" (DEVICE)—Die-castings (rough metal). CHARLES HILL & COMPANY, LIMITED, 259, Cateswell Road, Hall Green, Birmingham.

"METAFORMA" (DEVICE) — Metal furniture, etc. METAL FORMATIONS, LIMITED, Regent Works, Wheeler Street, Woodsetton, Dudley, Worcs.

"CORONET"—Metal closures for bottles. METAL CLOSURES, LIMITED, 73-75, Grosvenor Gardens House, Grosvenor Gardens, London, S.W.1.

"ELIZABETH ANN" — Metal kitchen-sink units. ANDREWS BROS. (BRISTOL), LIMITED, Albany Works, Albany Road, Twerton, Bath, Som.

"BAUXILITE"—Abrasive products, grindstones, etc. UNIVERSAL GRINDING WHEEL COMPANY, LIMITED, Universal Works, Doxey Road, Stafford.

"'SEABOARD SPECIAL'"—Tool and machine steel. SEABOARD STEEL COMPANY OF GREAT BRITAIN, Chantry Works, 87, Grove Lane, Birmingham.

"WINCO" (DEVICE)—Portable compressors. WINCHESTER MACHINE TOOL COMPANY, LIMITED, 294-296, Lillie Road, Fulham, London, S.W.6.

"BLACK PRINCE"—Small domestic utensils made of enamelled common metal or of aluminium; steel wool, etc. BLACKLER'S STORES, LIMITED, 74, Bold Street, Liverpool.

"FAIRMET"—Unwrought and partly-wrought common metals, installations for heating, cooking and ventilating purposes, etc. FAIRFIELD SHEET METAL WORKS, LIMITED, 127-129, Fairfield Street, Manchester.

Council Supersedes Liaison Committee

The American National Castings Council has been formally organised with the following founding members:—American Foundrymen's Association, Foundry Equipment Manufacturers' Association, Foundry Supply Manufacturers' Association, Gray Iron Founders' Society, Malleable Founders' Society, National Founders' Association, Non-ferrous Founders' Society, Inc., and the Steel Founders' Society of America. The Council has been organised to provide a medium for co-operative action among its members on matters of mutual interest beyond the scope of the individual societies or in connection with problems which can be handled better by co-operative action.

The Council has elected the following officers:—President, Mr. Howard A. Stockwell (president, Gray Iron Founders' Society); vice-president, Mr. Otto A. Pfaff (president, Foundry Equipment Manufacturers' Association); treasurer, Mr. F. Ray Fleig (president, Foundry Supply Manufacturers' Association); secretary, Mr. Frank C. Steinebach (editor, "The Foundry," Cleveland).

The recent formal inaugural meeting was devoted to a discussion of the organisation of the Council, and to further action in connection with the by-laws of the organisation. The representatives on the Council also discussed problems connected with safety codes; the idea of establishing a clearing house for convention and meeting dates of organisations in the foundry industry; contact with the Munitions Board of the Military Establishment with regard to the organisation of advisory committees for the foundry industry, and the development of programmes for apprentice training. Discussion also included present difficulties with raw materials supply; the organisation of the Office of Industry Co-operation by the Department of Commerce; and the report of the successful fund-raising campaign of the Foundry Educational Foundation. All Council members were represented at the meeting.

The Study of Creep

A summer school in theoretical physics, with particular application to creep in metals, will be held in the H. H. Wills Physical Laboratory of the University of Bristol, beginning on June 2 and ending June 5. The subjects to be treated will include:—Anelastic effects due to slip at grain boundaries; grain growth, recrystallisation and the theory of grain boundary slip; geometry of dislocation and the theory of slip bands; theory of transient creep; slip in solid solutions; diffusion of carbon in iron and elastic after effect; effects of carbon on the mechanical properties of iron; mechanisms of internal damping; crystal growth and the origin of dislocations.

The number attending the course will be limited to about 50. The fee for the course is £5 5s. Further particulars and forms of application can be obtained from the secretary of the Institute of Physics, 47, Belgrave Square, London, S.W.1.

Company News

(Figures for previous year in brackets.)

Cornercroft—Interim dividend of 6% (same).

Specialloid—Interim dividend of 25% (same).

Foster, Yates & Thom—Dividend of 5% (same).

Braithwaite & Company Engineers—Interim dividend of 4% (same).

Shanks & Company—Final dividend of 12½% (nil), making 17½% (15%).

British Lead Mills—Final dividend of 20% (17½%), making 32½% (30%).

London Aluminium Company—Final dividend of 75% (10%), making 100% (20%).

International Combustion—Final dividend of 27½% (22½% and bonus of 5%), making 37½% (same).

Gjers, Mills & Company—No interim dividend with respect to the year ended December 31, 1947 (same).

Weyburn Engineering Company—Final dividend of 25% (22½%), making 30% (35%, including bonus of 5%).

John Bolding & Sons—Final ordinary dividend of 15% (12½%), making 20% (17½%) and a dividend of 15% on the new ordinary shares.

Steel Developments—Profit for 1947, £4,167 (£4,589); final dividend of 2½%, making 5% (5½%); directors' fees, £300 (same); forward, £6,208 (£6,086).

Burnell & Company—Final ordinary dividend of 22½% (12½%), making 30% (20%); preference participating dividend of 7.184d. per share (3.5773d.).

Thomas Danks & Company—Net profit for the year ended September 30, 1947, £9,724; to tax, £5,800; dividend of 7½% and bonus of 2½%; forward, £6,235 (£4,016).

Hughes-Johnson Stampings—Interim dividend of 7½%, less tax (interim dividend of 7½% and final payment of 7½%, both less tax), and distribution out of capital surplus of 4⅛%, tax free.

English China Clays—Profit for the nine months to September 30, but including full year's income from subsidiaries, £48,339 (£48,124 for previous year); dividend of 4% for nine months (4% for year).

James Booth & Company—Net trading profit for 1947, £130,684 (£137,470); interest, etc., £3,057 (£5,607); to fees, £4,750 (£4,632); staff fund, £5,000 (same); dividend of 20% (15%); forward, £259,726 (£224,395).

Richards Bros. & Sons (1946)—Interim dividend of 10%. The directors state that, in the absence of any unforeseen circumstances, a dividend at the rate of at least 22½% per annum will be recommended. The company was made public in September, 1947.

Jonas Woodhead & Sons—Profit for the 13 months to September 30, 1947, £63,848 (£40.932 for year); E.P.T. recoverable, £12,000 (£42,900); taxation provision not required, £5,000 (nil); to general reserve, £10,000 (£30,000); net profit, £48,411 (£39,151); dividend of 10% (same); forward, £23,661 (£22,651).

Obituary

MR. JAMES WALKER, who has died in a nursing home at the age of 69, was in business in Glasgow as a pig-iron and coal agent.

MR. ROBERT CRAWFORD BRASS, who was associated for 46 years with G. & J. Weir, Limited, engineers and founders, of Glasgow, died on January 29.

MR. JAMES BEATTIE, assistant consulting marine engineer and ship surveyor with E. K. Wallace & Son, Glasgow, died suddenly on January 28. He was 74.

MR. A. E. CLARK, a partner in John H. Clark & Company, ironfounders, etc., of South Tottenham, London, N.15, died on January 29 at the age of 70.

MR. JOHN DAVIES, joint founder in 1900 with his brother, the late Mr. Edmund Davies, of the firm of E. Davies, Atlas Foundry, Shrewsbury, has died at the age of 68.

MR. EDWARD KENNEDY, formerly an electrical engineer with the Appleby-Frodingham Steel Company, Limited, died suddenly on January 29. Mr. Kennedy, who was 55, was a former Mayor of Scunthorpe.

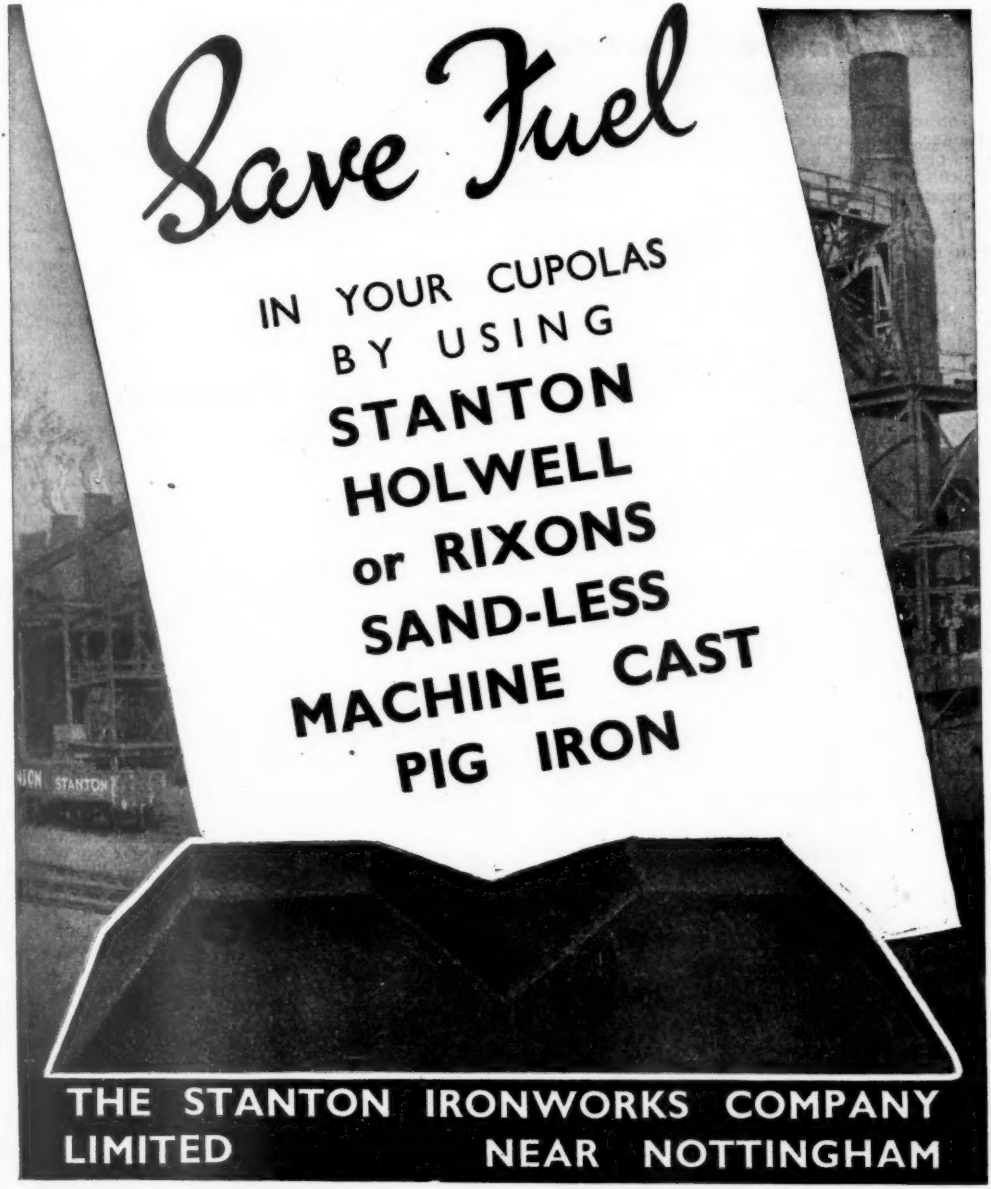
MR. THOMAS CASSIENET PALMER, who died at Hove on February 4, was formerly a director of W. J. Fraser & Company, Limited, manufacturing chemical engineers, boiler and tank makers, of Dagenham, Essex. He was 87 years of age.

MR. GEORGE W. SPINNEY, who was on the boards of the Consolidated Mining & Smelting Company of Canada, Limited, the International Nickel Company of Canada, Limited, the Steel Company of Canada, Limited, and other companies, died at Montreal on February 1. Mr. Spinney, who was born in 1889, was president of the Bank of Montreal.

LIEUT.-COL. T. P. PARMETER, whose death has occurred at the age of 68, was senior partner of the Newcastle-upon-Tyne branch of Price, Waterhouse & Company, Limited, chartered accountants. He was closely associated with the iron, steel, shipbuilding, engineering, and shipping industries on Tyneside and played an important part in an advisory capacity in a number of company reconstructions and reorganisations which the depression of the 1930's involved.

MR. JOSEPH MAURICE D'ARTOIS, founder of the Brussels firm of J. M. d'Artois & Company, iron and steel merchants and stockholders, died recently at the age of 76. The company was established in 1894 and Mr. d'Artois was active up to the time of his death. His youngest son, Mr. George d'Artois, has been appointed a director, and the firm, which was converted into a limited company a year ago, is managed by Mr. M. L. Loriaux, a partner of the late Mr. J. M. d'Artois.

IT IS REPORTED from Belfast that the Northern Ireland Ministry of Labour and National Insurance has given notice of the intention to make special regulations under the Factories Act applying, with certain exceptions, to all shipyards and dry docks. The shipbuilding and shiprepairing industry in Northern Ireland is thus being brought into line with the practice in Great Britain.


Save Fuel
IN YOUR CUPOLAS
BY USING
STANTON
HOLWELL
or RIXONS
SAND-LESS
MACHINE CAST
PIG IRON
THE STANTON IRONWORKS COMPANY
LIMITED
NEAR NOTTINGHAM

Raw Material Markets

Iron and Steel

The recent expansion of pig-iron production is exercising a favourable influence on the deliveries to the steel plants. Even now, however, there is no scope for replenishing stocks, although current needs are fairly adequately covered. On the other hand, the difficulties at the foundries are still acute. Production of castings last year reached an impressive total, and further improvement is possible if the requisite material can be provided. At present, however, neither pig-iron nor cast-iron scrap is coming forward in sufficient quantity and, as soon as the fuel situation permits, more blast furnaces will have to be put into operation to enable the foundries to execute the extensive orders on their books. Meanwhile, there is a dearth of high-phosphorus iron and inquiries are also being made for more hematite and refined iron.

Re-rollers are now required to pay an extra 5s. per ton for billets, blooms and slabs. Happily, an expansion of output has compensated for the shrinkage of imports and the re-rollers of light bars, sections, and strip are achieving satisfactory outputs. The mills engaged on the lighter gauges of sheets, however, are still in need of more liberal supplies of sheet bars and, as hopes of increased imports are very faint, a rectification of the immediate stringency would appear to be dependent upon increased home production.

Further information concerning the revision of steel priorities indicates that a more flexible system appears to have been devised, but the over-riding fact is that even the requirements of essential industries cannot be fully satisfied and many consumers will be put on short rations. Rollers are endeavouring to clear off old orders before the end of March, but at best there will be heavy cancellations when the new I.S. authorisations come into force in April. Impressive tonnages of plates, sections, rails and bars are being supplied, and there is also a swelling demand for special steels.

Non-ferrous Metals

At the time of writing, scrap-metal prices are holding firm, but buyers are very shy and there are signs that some of the merchants are getting ready to cut prices, which have, of course, been pushed to an absurdly high level on the plea of lack of supplies. This explanation of the rapid advance in the secondary-metal quotations has never seemed very plausible and it is more than likely that any clear indication that the trend has turned downwards will result in a spate of selling, for, at the levels reached recently, dealers can well afford to sell short. It is regrettable that a marked trend towards speculation has been in evidence in the scrap market, and it is reported that some consumers have found deliveries against purchase contracts unduly prolonged.

Whether 1948 is to be a year of declining prices remains to be seen, and, so far as metals are concerned, it is perhaps worth remembering that world shortages still exist in copper, lead, tin and zinc. In the United States, demand remains very good and it is difficult to see how sentiment can change to a bearish angle in the near future. But across the Atlantic events move quickly and the possibility of consumption suffering a sudden setback cannot be ignored. One thing seems to meet with common agreement and that is the likelihood of the downward plunge in values being fairly rapid. Judging by the comparatively speedy manner in which the Ministry of Supply adjusted its price for zinc, the authorities are getting ready to cope with the possibility of a run of changing values. The break, when it comes, is certainly going to place the Government in an awkward position, for it must be committed to take a lot of metal, much of it at prices already determined. In a falling market, consumers are likely to show themselves very reluctant buyers, and stagnation will result.

New Companies

("Limited" is understood. Figures indicate capital. Names are of directors unless otherwise stated. Information compiled by Jordan & Sons, 116, Chancery Lane, London, W.C.2.)

J. R. M'Kellar (Alloys), 12, Hamilton Street, Paisley—£35,000. J. and W. Dickie.

Bertram Spiers, 11a, Northampton Street, Birmingham—Die sinkers, casters and moulders, toolmakers, etc. £2,000. B. and L. Spiers.

James E. Cowper, Main Street, Bothwell, Lanarkshire—£10,000. Metal merchants, engineers, etc. J. E. Cowper and A. C. Ramage.

L. A. Luck & Company, 12, Conduit Street, London, W.1—Iron and steel merchants, etc. £5,000. L. A. and B. J. Luck, and G. W. Tinniswood.

James & Brinkworth, rear of 34, Newtown Road, Bedworth, Warwickshire—Engineers and toolmakers. £5,000. T. A. James and W. E. Brinkworth.

Dualloys (1947), Boden Works, Boden Street, Chard, Som—Manufacturers of metals, etc. £100,100. T. W. Vernon, S. Capel-Peck, and J. W. Warrington.

White & Company, Beeston (Notts), 2, Wollaton Road, Beeston, Notts—General and mechanical engineers, etc. £5,000. A. Owen, F. L. and J. H. White.

Francis White, Sheffield Street, Heaton Norris, Stockport—Engineers, machinery manufacturers, etc. £10,000. F. White and J. E. Storey.

A. H. Goodall, Ryland, near Welton, Lincs—Agricultural-machinery contractors. £25,000. A. H. Goodall and V. I. Walmsley.

Pease & Partners Normanby Iron Works, 20-26, Northgate, Darlington—To acquire a certain part or department of the undertaking, business, property and assets of Pease & Partners, and to carry on business of steelmakers, ironmasters, etc. £600,000. A Whyte, Sir R. A. Pease, and R. Mather.

Edward Curran Engineering, Hurman Street, Bute Docks, Cardiff—To acquire and amalgamate the businesses of Curran Bros., Edward Curran & Company, Curran Products, and Curran Machine Tools, and to carry on business of manufacturers of aluminium hollow-ware, etc. £400,000. J. and P. E. Curran, B. R. Turnbull, and E. V. Mayer.